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AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

GOVERNMENT BOTANICAL GARDENS
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VOLUME I.

APRIL TO DECEMBER 1902.

ISSUED UNDER THE AUTHORITY OF THE

COMMISSIONER OF AGRICULTURE FOR THE WEST INDIES.

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A FORTNIGHTLY REVIEW

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IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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EDITORIAL.

With the view of supplying, in a popular form, information of an agricultural character suited to the requirements of the West Indies the "Agricultural News" is launched to-day.

It lays no claim to public recognition beyond an earnest desire on the part of the Imperial Department of Agriculture to instruct and assist all classes of the community and to promote the agricultural interests of these Colonies.

It is hoped that the "Agricultural News," which is proposed to be published for distribution by each mail, will serve as an expeditious means of communicating with the numerous official and other correspondents of the Department, and that it may be of service, also, to members of the general public who desire to keep themselves closely in touch with agricultural efforts in the West Indies and elsewhere.

A special feature of the "Agricultural News" will be information respecting the interesting work now going on at the Chemical Laboratories, Botanic Institutions, Experiment Stations, Agricultural Schools, Experiment Plots, Agricultural Shows, as well as a record of the very considerable activity manifested in promoting agricultural education in the Colleges and Schools in the West Indies.

It is hoped the "Agricultural News" will appeal both to the planter and the peasant. As already announced it will be regularly on sale by the Local Agents of the Department, and this fact, combined with the moderate price proposed to be charged for it, should place it within reach of every person owning, or cultivating, land throughout the West Indies.

EXPERIMENTAL CANE CULTIVATION AT BRITISH GUIANA.

The following is a brief progress report prepared by Professor J. B. Harrison, C.M.G., on the experimental sugar-cane cultivation carried on at British Guiana from July to December 1901, in connection with the Imperial Department of Agriculture :—

The area at the Botanic Gardens used for experiments with sugar-cane is thirty-one acres, while a subsidiary area of five acres is being gradually brought under experimental cultivation at Onderneeming School near Suddie, Essequibo. The fields in use at the Botanic Gardens comprise two at the back of the estate known as the Old or South field, and the New or Northfield and a small one of between three and four acres in extent in front of the Gardens proper but in close proximity to the nursery termed the Brickdam field. The fields at the back of the Gardens have been enclosed with a barbed wire fencing, a draining engine, and a sugar-cane mill have been placed there, while the necessary offices, laboratory and manure sheds have been erected there, the cost of doing which has been borne by the local Government. These are all now in good order and are supplied with the apparatus, etc., necessary for efficient working.

During the period under review the fields have been utilized as follows :—

The South Field.—This contains an area of fourteen acres. The manurial experiments initiated in 1890 have been continued. Owing to the late period in which the work was taken in hand the canes were not sufficiently matured for reaping during the October and November crop season but will be reaped during the March and April season. The western side of the field has been occupied by beds of canes of the older known varieties and of the earlier obtained seedlings. As on this part of the field the soil has become, mainly from the defective drainage-conditions existent in previous years, in a state of temporary agricultural exhaustion, I directed its temporary abandonment for cane cultivation when the canes were taken off it at the end of the year. In the same field were large plots of selected seedling varieties. These had not suffered from the drought, etc., to anything like the extent the manurial experiments had done. Large crops were obtained on these, and after weighing, etc., the canes were distributed towards the end of the year in very large numbers to the estates which had applied for them. A large area of the field is occupied by the small plots on which the preliminary trials of selected seedlings are carried on and fortunately this was not so adversely affected as some other parts were and interesting and valuable results were obtained when they were reaped towards the end of the year. The field is now in a satisfactory condition, very different, owing to Mr. Ward's untiring efforts and strict supervision, to that in which it was at the commencement of the half-year under review.

The North Field.—The area of the field is about fourteen acres. It has been cleared from the dense bush which covered it, and the greater part of the large trees growing upon it have been cut down and removed. As a commencement of this could not be made until after the preliminary steps had been taken towards the extension of the work undertaken since the Grant-in-Aid became available in October 1899, a portion of it has been in use since early in 1900 for the purpose of growing selected cane seedlings. A larger portion was gradually cleared, drained and brought into cultivable condition and in July a considerable area was laid out for an extension of the manurial experiments. This consists of a series of experiments arranged to test the varying requirements of the more promising varieties of seedling canes for nitrogenous manures. Twelve varieties are under observation for this purpose and have made active and vigorous growth. It is intended to reap them in October or September next.

The Brickdam Field.—This field is principally occupied at present by a series of plots on which about thirty of the most promising kinds of seedlings are being grown as plant canes, 1st, 2nd, and 3rd ratoons. It is a field of marked fertility, and the results obtained upon it in the crop of 1900 and 1901 have been of much interest. As it is situated at the top of the Brickdam and the electric tram-cars pass by it every quarter of an hour in the day, thus placing it within easy access from all parts of the city, this field is well suited for the important purpose which it serves as a demonstration field on which the modes of growth etc. of the most promising varieties of canes can be studied by visitors. In addition to the plots containing varieties of canes there is a considerable area occupied with experiments laid down on the lines successfully followed in Java with the object of obtaining cross fertilization of certain kinds of canes. In arranging this I had the advantage of the assistance and advice of Dr. Went formerly of Java, the well known authority on all questions of sugar-cane cultivation.

During the latter months of the year a large number of seedlings were raised from the seed of twenty selected varieties of canes. Two hundred and fourteen thousand seeds germinated and from these about twenty-eight thousand plants have been reserved at the Gardens for further investigation. A large number of seedlings in boxes have since been supplied to Plantations Albion, Windsor Forest, Vryheid's, Lust and Hope, where the managers will carefully raise them and study their modes of growth etc. The willingness and, in many cases I may say, the anxiety of the managers of the sugar estates in the Colony to aid us in our work and to carry it on beyond the limits we are necessarily bound down to is a most gratifying feature of the local work.

In July about five thousand eight hundred seedlings raised in the cultivation of 1900 were planted out in the fields and have since been kept under careful observation.

I propose that in future years a still more rigorous system of selection shall be used both with reference to the parent varieties and to the seedlings retained for trial. I believe that better results are likely to be obtained in this manner than by raising and keeping

vast numbers of seedlings in the hope that by some fortuitous chance one or more may turn out of value.

I visited the counties of Essequibo and Berbice during the period under review and examined the very extensive series of experiments being carried on by the New Colonial Company on their estates in these counties in conjunction with ours at the Gardens. I have also visited Plantations Diamond, Windsor Forest, and some others in Demerara, examining the experiments being carried on and giving any advice and assistance in my power to the managers and others controlling them. Mr. Ward visited other estates and rendered valuable aid in this branch of work. . . . . .

It has been arranged by the Board of Agriculture that in future years the officers in charge of these experiments shall be advised and assisted by a sub-committee appointed by the Board, among the members of which will be certain of the most experienced planters in the Colony and the leading technical experts; the actual executive control remaining in the hands of the official or officials at present directing them. This arrangement will in my opinion tend materially towards the practical success of the Experiments, and by its combination of practical expert knowledge and experience with scientific skill should increase the confidence of the planters of the Colony in the reliability of any results published as obtained in the experiments conducted in British Guiana.

ROOT DISEASE OF SUGAR-CANE.

Canes attacked by the common root disease of the sugar-cane in the West Indies are familiar to the planters. Such diseased stools are distinguished by the fact that instead of forming cane the shoots continually bud from below giving rise to a dense tuft of dwarfed canes. Such canes on examination are seen to be covered at the base with a white, musty smelling, fungus growth which causes the lower leaves to adhere firmly to the stem of the cane. This fungus growth belongs to a common toadstool—a species of *Marasmius*—which may be seen in large numbers on the base of the shoots in wet weather. The fungus attacks the cane in Java as well as in the West Indies.

In consequence of the economic importance of this root-disease attempts have been made to find a direct remedy for this disease, that is to say, to find some means of arresting the disease when it has once shown itself. An experiment was made on October 17, 1901, in which four plots of 100 holes each of first crop canes attacked by the disease were treated as follows:—

(1). Canes stripped, sprayed at the base with Bordeaux mixture and then moulded up.

(2). Canes stripped, sprayed at the base with Bordeaux mixture, limed at the rate of one quart of air-slacked lime per stool and then moulded up.

(3). Canes stripped, limed as in (2) and then moulded up.

(4). Control plot—untreated. This was a better plot than any of the above.

The canes were cut and weighed on February 27, 1902 and the following results were obtained.

Plot.	*Wt. of sound canes*	*Wt. of rotten canes.*	*Total.*
(1).	1092	72	1164
(2).	1106	20	1126
(3).	1411	34	1445
(4). (Control)	2132	65	2197

The result shows that the treatment is not likely to be of any practicable use. The figures are of interest however, as showing that in the whole plot of one-third of an acre the tonnage of canes was at the rate of only eight tons per acre. The importance of the disease is evident. The indirect methods applicable to the disease are based on the idea of starving the fungus by depriving it of suitable food. Fields attacked by the disease should be first of all isolated by a trench from the rest of the estate so as to prevent the fungus spreading under ground. After reaping the stumps should be dug up and burnt along with the trash remaining on the field. After thoroughly ploughing up the field some rotation crop should be planted after which the field could be again placed under canes.

In connection with these indirect methods of dealing with the disease an examination of sweet potatos from a cane field attacked by the root-disease of the sugar-cane is of interest. It was noted by one of the planters that where a hole of sweet potatos occurred near an old cane stump, the potatos became covered with a white fungus growth. Examination of these specimens showed that the fungus on the potatos *is probably the same* as that which attacks the cane. Evidently, therefore, when a diseased field is thrown out of cane-cultivation the old stumps should be carefully dug up and burnt before the planting of any rotation crop.

MOTH BORER IN SUGAR-CANE. *

Throughout the West Indian islands the sugar-cane crop is now being reaped and the young canes have attained a certain height. This is the best season for fighting the moth borer by cutting out deadhearts and collecting the eggs. The work now done, in this way, will produce the greatest result for the least expenditure of time and effort. In Barbados there appears to be no lack of moth borer this season and it is to be hoped another year will not be allowed to go by without a more determined effort being made in all sugar growing Colonies in the West Indies to combat this pest wherever present. The insect and the remedies recommended for it have been fully discussed and full information may be found in the *West Indian Bulletin.* (Vol. 1. pp. 338-345 and Vol. II. pp. 41-43).

Egg collecting is the simplest and cheapest remedy and careful work in this direction would prevent the later occurrence of deadhearts, since it destroys the pest before it can do harm. In a dry season such as the present, planters hesitate to cut out many shoots in the young canes but there need be no

* *Diatræa saccharalis.* Fabr.

hesitation in cutting off the eggs on the leaves. Having got the eggs they should be spread out in the sun near the young canes so that the parasites (those friends of the sugar planter) may escape and find their way back to the canes. At this time of the year there are few parasites in the eggs. In a batch of five hundred egg clusters recently collected on an estate in Barbados, only one per cent. showed parasite attacks; but as the season advances and the parasites have less difficulty in finding an abundance of eggs on the young canes, this proportion will grow much larger.

The planter can do much to encourage the increase of the parasites, so that by the time the canes are getting too tall to be searched for eggs the parasites become numerous enough to do very effective work in checking such moth borers as may still be found in the canes. The time for this work is necessarily short but the opportunity should not be allowed to pass this year.

PREPARATION OF COMMERCIAL PAPAIN.

It is well known that the milk obtainable, especially from the fruit, of the papaw tree *(Carica Papaya)*, possesses the property of rendering meat tender and in fact of partially digesting it. In recent years this property has been utilized by evaporating the milk into a dry powder known as 'papain.' There is a moderate demand for this substance and where the papaw tree is abundant it might be advantageous to prepare it. The following account of preparing crude or commercial papain has been contributed by the Hon'ble Francis Watts, F.I.C., F.C.S.:—

The preparation of crude papain is a comparatively easy matter, provided that attention is paid to certain matters of detail.

COLLECTING THE MILK.

The juice, or milk, which forms the starting-point is procured by making a scratch or shallow incision in the skin of the fruit of the papaw while in a green condition. It is desirable to employ a bone or wooden knife, like a paper-knife, for the purpose. The milky fluid rapidly exudes and may be caught in a cup held beneath the fruit. After a time the flow diminishes and the liquid coagulates in the neighbourhood of the incision; this is carefully removed by means of the bone or wooden knife and placed in the cup with the milk already collected. The fruit is not removed from the tree and it may be subjected to the operation of tapping several times at intervals of two or three days.

It is essential that no iron knife, or iron utensils, should be brought into contact with the milk. Wood or bone should be employed, and the milk should be collected in earthenware basins or cups, or in glass vessels, and not in tins, which are sure to blacken it.

After collecting, the juice soon becomes coagulated and then should be in the form of a snow-white curd, possessing a somewhat pungent, but not putrid, smell. It speedily decomposes if not rapidly dried, and, when decomposing, emits a most unpleasant odour. It is necessary then that drying should be effected as speedily as possible. When considerable quantities are being prepared, the collection of the juice or milk should be undertaken in the early morning and the drying should begin before midday. This ensures that by evening the material is in a sufficiently dry condition to keep without deterioration until the following morning when the drying can be completed.

DRYING THE MILK.

The drying may be effected in several ways. In dry, hot weather the coagulated milk may be placed in thin layers on sheets of glass and exposed to the sun. This, however, is rarely satisfactory on a large scale, and it is best to adopt some form of drying apparatus. Drying is well effected by spreading the coagulated milk on drying frames made by stretching brown linen on light wooden frames, somewhat like those used for framing school slates: these may be of any suitable size to fit the drying apparatus employed.

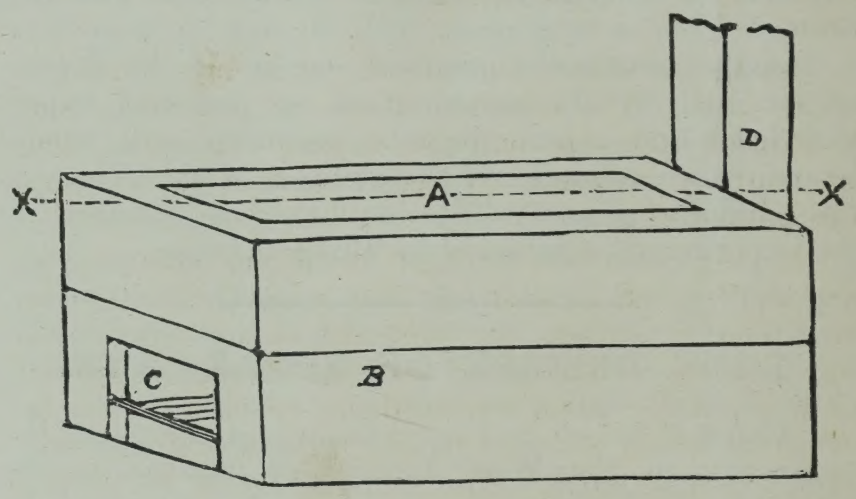

Fig. 1. Elevation.

A small American fruit drier will answer very well, or a drying-stove (Fig. 1) may be constructed by building, in brick, a chamber about 3ft. high, 3ft. wide and 6ft. long, (these dimensions can be changed in accordance with the amount of material to be dealt

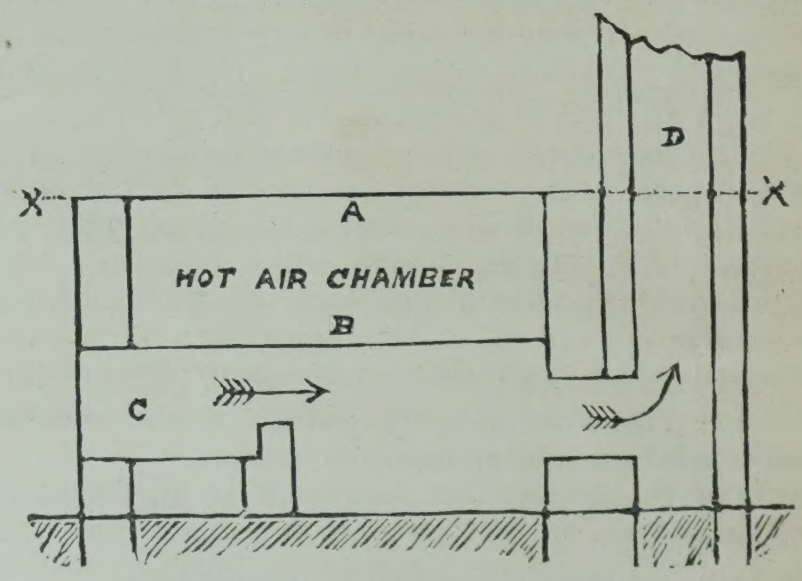

Fig. 2. Section along the line x. x. of Fig. 1.

FIGS. 1 AND 2. DRYING STOVE, FOR THE PREPARATION OF PAPAIN.

(A). Opening, across which the drying trays are supported. (B). Iron plate. (C). Fire Grate. (D). Chimney.

with). This is open at the top. About a foot from the top the chamber is divided horizontally into two compartments by a sheet of iron, (B.) and below this division a small fire grate (C.) is constructed; at the opposite end from the grate a chimney (D.) is placed to lead the smoke from the lower compartment. (Fig. 2.) In order to obtain an even heat in the upper compartment it is well to spread a layer of sand, one or two inches thick, over the iron plates. The frames carrying the coagulated milk are placed on the top of the chamber, so as to form a lid or cover to the opening (A.) when heat from the iron plate drives off the moisture at a low temperature.

It is important that the temperature at which drying is effected shall be as low as possible. Any overheating destroys the active principle, so that a carelessly prepared product may be useless. In practice, the temperature is kept as low as is consistent with getting the substance dried before decomposition sets in: if this can be done without the temperature of the tray being raised above 100 deg. Fahrenheit so much the better.

As the substance becomes dry it shrinks considerably in bulk. The contents of several trays may now be emptied into one and the drying continued. The trays emptied are ready to receive another day's supply of fresh material.

Drying must be continued until the substance is crisp and in such a condition that it can be reduced to a fine powder without any difficulty being experienced from stickiness. The dried material should be ground to a fine powder when the resulting product should be a white or cream coloured powder with a characteristic, but not putrid, smell. The powder should be packed in tins or bottles, and carefully preserved from contact with the air. Grinding is easily effected in a mill of the type commonly employed for grinding coffee: when grinding it is desirable to have the papain slightly warmed.

CASSAVA POISONING.

Amongst the important food plants cultivated in the West Indies is the 'Cassava' or 'Manioc' (*Manihot utilissima*, a member of the Spurge Order, or *Euphorbiaceae*), grown for the sake of the store of starch contained in its long, thick roots. Two kinds of cassava are commonly recognised, the 'bitter' and the 'sweet,' and sometimes considered to be two distinct species of plants. Bitter and sweet cassava are put to separate uses. From the bitter variety, after grating and careful expression of the milky juice, a flour is obtained from which thin cassava cakes are made. It is also the source of 'farine' and the tapioca of commerce. The raw juice cooked and concentrated is known as casareep. The sweet cassava is more commonly eaten, as a vegetable, after boiling or roasting. Bitter cassava in the fresh condition is well known to be harmful and experiments have been made which prove the extremely poisonous character of its milky juice. The poisonous constituent of the raw juice is prussic acid, or hydrocyanic acid, easily recognizable by what is known as the 'smell of bitter almonds.' Prussic acid is fortunately a poison which it is comparatively easy to get rid of completely. It is only neccessary to ensure that the substance containing it shall be thoroughly heated, and all the prussic acid present is destroyed and the substance rendered perfectly harmless.

As already said, bitter cassava is universally regarded as a poisonous substance. With regard to sweet cassava, on the other hand, opinions vary and even in a standard book of reference on Chemistry it is stated that 'the milky juice in the sweet variety is innocuous, whilst that in the bitter is highly poisonous.'

Deaths from eating improperly prepared sweet cassava occur from time to time in the West Indies, principally amongst badly-fed or neglected children. In order to prevent, if possible, the recurrence of such accidents, it is desirable that the actual facts should be published and made widely known in the hope that teachers and others may be able to put children on their guard against the danger of eating sweet cassava unless care has been taken in its preparation.

As long ago as 1877, Professor Francis, then Government Chemist at Trinidad, stated, as the results of experiments that sweet cassava root contained considerable quantities of prussic acid. His work has recently been repeated and extended by his successor Professor P. Carmody (*Annual Report of the Government Analyst, Trinidad*, 1901, p. 15). From their investigations it appears that sweet cassava not only contains the poisonous prussic acid, but contains nearly as much as bitter cassava, and that by mere chemical analysis it would be impossible to distinguish between the two. Professor Carmody was able to show that whilst in bitter cassava the prussic acid is distributed more or less uniformly throughout the tissues of the root, in the sweet cassava it is located chiefly in the skin and outer portion of the rind. It follows that in order to prepare sweet cassava so that it may be a safe food for human beings the following precautions should be taken:—

(1) Carefully scrape off the skin and outer portion of the rind, whereby the greater portion of the poison will be removed.

(2) Thoroughly heat the remainder by boiling or otherwise, so as to destroy and drive off any remaining prussic acid.

Thus prepared sweet cassava is a thoroughly wholesome article of food, as the experience of many who eat it regularly is sufficient to prove.

One other word of warning is necessary. Professor Carmody has indicated that although all the prussic acid originally present in the root may be got rid of, it is possible that a small further quantity may be formed later by changes dependent on the addition of water. Cassava which has been cooked and then kept for some time may still be a dangerous substance, and should not be eaten. The rules to be followed in preparing and eating sweet cassava are thus:—(1) Scrape the root. (2) Cook it well, so as to heat it throughout. (3) Eat cassava only after it has been freshly cooked.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Imperial Commissioner of Agriculture, Head Office : Barbados. It is particularly desired that no letters be addressed to any member of the staff by name. Such a course will, entail delay in dealing with them.

Communications should always be written on one side only of the paper. It should be understood that no contributions or specimens will, in any case, be returned.

All applications for copies of the "Agricultural News" should be addressed to the Local Agents and not to the Head Office. Where no Agents exist subscriptions at the rate of 4/4 per annum, payable beforehand, will be received at the Head Office.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News.

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NOTES AND COMMENTS.

Colonial Exhibition at the Royal Exchange.

The Exhibition of Colonial products opened at the Royal Exchange in London by the Lord Mayor on March 10, appears to have been an unqualified success. The West Indies were not largely represented, but the Imperial Department of Agriculture forwarded specimens of sugar-cane, yams, sweet potatos, pigeon peas and other products which attracted attention. The following is an extract from the leaflet circulated in the West Indian Section, in charge of Messrs. James Philip & Co :—

'The main products of the British West Indies are sugar-cane, cacao, coffee, log-wood, nutmegs, limes, arrowroot, rum, bananas, oranges, pine-apples, cocoa-nuts, sweet potatos, yams, maniot, etc. In some of the islands cattle and horses are profitably reared. Asphalte is obtained from the famous pitch lake in Trinidad, and gold, diamonds and valuable timber from British Guiana. The climate of the West Indies is the most perfect in the world, and the islands are well worth a visit, especially as a happy way of escaping the English winter. There are several good lines of steamers, the Royal Mail Steam Packet Company, leaving Southampton every alternate Wednesday. Messrs. Elder Dempster have several fast steamers, to develop the Fruit trade between Jamaica and this country, and Messrs. Scrutton, Sons & Co. and W. Smith & Co. have also cargo steamers trading with the West Indies.'

Toronto Exhibition, 1902.

The desirability of encouraging closer trade relations between the West Indies and the Dominion of Canada is recognized on both sides. An excellent opportunity for bringing the produce of these Colonies under the notice of our fellow subjects in Canada is offered by the Great Fair to be opened in the City of Toronto on August 26 next. Toronto itself is a city of 225,000 inhabitants and is the centre of a large manufacturing district which contains a number of towns with populations of from five to twenty thousand.

The Imperial Department of Agriculture has already been in official communication with the several Governments of the West Indies and furnished particulars of the proposed Exhibition. Messrs. Pickford and Black are prepared to carry, freight free, to Toronto all West Indian produce packed and delivered alongside their steamers, and they further undertake to unpack such produce and arrange it in an attractive manner at the Exhibition. It is important that all exhibits be ready to be shipped from British Guiana, Tobago and Grenada by S.S. 'Dahomey' on July 5, and from all other Colonies (except Jamaica) by the 'Ocamo' from 23 to 30 July next. An attractive booklet containing information respecting the West Indies and their products will be prepared by this Department for distribution at the Exhibition.

A new African Coffee.

The Coffee known as the Highland Coffee of Sierra Leone was introduced to the West Indies about six years ago through the instrumentality of the Royal Gardens, Kew (*Kew Bulletin* 1896, p. 189 ; with plate.) It is quite distinct from either Arabian or Liberian Coffee and is admirably suited for cultivation from sea-level up to an elevation of about 800 feet. The botanical name (*Coffea stenophylla*) that is 'narrow-leaved coffee' is a good name, as by this character and its small, dark-purple berries, it is readily distinguished from all other coffee. 'Stenophylla' coffee has nowhere been more successful than under Mr. Hart's care at the Royal Botanic Gardens at Trinidad. It has grown there into tall handsome bushes ten to twelve feet high, loaded with berries. It is singular that it has shown a marked tendency to be cross-fertilized by Liberian coffee, so that in the second or third generation its original characters have almost entirely disappeared. If this coffee is desired to be kept distinct, it must therefore be cultivated away from other coffee plants.

Value in London Market.

As is well known the price of Coffee, just now, is very low. In some cases it hardly pays the cost of cultivation. On the other hand there is a continued demand for good coffee and it may be anticipated that in the ordinary course of 'ebb and flow' of prices a time will arrive when coffee will again be as remunerative as cacao and other crops. A sample of 'Stenophylla' coffee, grown and cured at the Trinidad Botanic Gardens, was lately forwarded by this Department to Messrs. Wilson, Smithett & Co., 39, Mincing Lane, London, E. C., and they report as follows :—

'The coffee roasts evenly and the infusion is good, better indeed than could be expected from the appearance of the raw bean. This variety of coffee is not known on the London market, but might readily become a marketable

product. Owing to the present low price of 'Santos' [Brazil Coffee] we could not value it, in the present state of the market, at above 38s to 40s per cwt. in bond.'

Messrs. C. M. & C. Woodhouse of Mincing Lane also report as follows:—

'We look favourably upon the sample and see no reason why the coffee should not find a ready sale. To-day's value is about 42s. per cwt.'

Seeds of 'Stenophylla' coffee, in moderate quantities, are probably obtainable at all the Botanic Institutions, in the West Indies.

The Production of Cacao in Africa.

A West Indian merchant writes to *The Times* to say that in a few years' time Africa seems likely to prove a formidable rival to South America and the West Indies as a producer and exporter of cacao and those interested in the West Indian possessions of the United Kingdom and anxious to see the islands more prosperous will do well to watch how the cultivation of cacao is being pushed on with satisfactory results throughout the continent of Africa. This year the German colony of the Cameroons hopes to ship 3,000 bags of cacao, to be increased, it is estimated, to 10,000 bags in 1906. Our correspondent adds:—'Mr. McClounie, head of the scientific department of British Central Africa, reports the successful shipment from Kew and receipt at Lomba of 210 plants, which had been planted out and were doing well. Lagos is also going in for cacao, and one of her planters is now travelling in the West Indies to see how the estates are managed in Trinidad and Grenada.' He also says that the little Portuguese island of St. Thomè has greatly increased its export of cacao in ten years, the shipments in 1891 being under 4,000 tons, whilst last year very nearly 16,000 tons of cacao were exported.

Bloom on Grenada Cacao.

Messrs. Cadbury Brothers, the well-known manufacturers of cocoa and chocolate, near Birmingham, have drawn the attention of this Department to a bloom that appears on 'quite a number of the best brands of Grenada cacao and is always an indication of superior quality.' More recently samples of Grenada cacao with the characteristic bloom referred to were received direct from Messrs. Cadbury Brothers. A careful examination revealed the fact that the so-called bloom consisted almost entirely of mucilage cells and bacteria. It has probably been produced by checking the fermentation at a certain point and subjecting the beans to an incipient fermentation before or after the final curing. Messrs. Cadbury add 'we cannot say that any mark invariably has the bloom' while at certain seasons 'others show a very good bloom.'

Disease of Bananas in Egypt.

The Department has been consulted in respect of a disease affecting the Chinese banana cultivated in lower Egypt, especially in the neighbourhood of Alexandria. Apparently one cause of the disease is the presence of Nematode worms destroying the roots. Similar worms (*Heterodera*) have been known to attack sugar beet; also bananas cultivated at the Botanic Garden at Berlin; and probably bananas at Fiji (*Kew Bulletin*, 1890, p. 272; 1892 p. 48, and 1894, p. 281). The remedy suggested is the use either of slacked lime, lime mixed with soot, or lime from gas works. The application of these substances would be likely to be beneficial to the plant itself, as well as fatal to the worms.

Sweet Potatos.

The following note is taken from the Barbados *Agricultural Reporter* of April 12:—

The light showers, totalling in one district for the fortnight 68 parts, have been of some little benefit: although not enough to water, yet cooling and refreshing to thirsty plants. Potatos are fortunately plentiful and cheap. People cannot starve when 100lb of these nutritious roots can be obtained for 1*s*. 8*d*. It is pleasing to see that the efforts of the Imperial Department of Agriculture to introduce these vegetables into England are being sustained. These and the many other valuable foodstuffs which we produce, now almost valueless catch crops, would materially swell our exports were their food value sufficiently known and appreciated. At present even our little potato trade with Trinidad and Demerara has been stopped by the smallpox scare. It is the office of the Imperial Department of Agriculture to take these minor products in hand, to encourage and improve their growth, to popularize and to market them. The success of the Department means much to the West Indies. Under fostering care Minor will grow to Major, and the danger of the eggs in the one basket system be at least lessened. The Department's work is good, and when the initial task is complete, and the foundation laid, its result will be more manifest. At all events the West Indian agriculturist now thoroughly understands that agriculture, the world over, depends necessarily for success not on one but many products.

Jack-in-the-Box Tree.

In some of the Islands of the West Indies, occurs but by no means commonly, a tree known locally as 'Jack-in-the-box,' a name probably derived from its curious fruit. The botanical name of the plant, *Hernandia sonora*, commemorates Francisco Hernandez, physician to Philip II of Spain, and a writer on natural history, who travelled in the West Indies in the sixteenth century. 'Jack-in-the-box' is not a native of the West Indies, but of the East Indies and the Pacific Islands. According to the *Treasury of Botany*: 'The bark, seed and young leaves are slightly purgative. The juice of the leaves is a powerful depilatory, destroying hair, wherever applied, without pain.' Recently inquiry from the United States, has been made at the St. Vincent Botanic Station, concerning this plant, and the Curator has furnished ten pounds by weight of the fresh leaves for experiment purposes. A report on the value of these leaves will be awaited with interest. It would be of advantage to learn whether this plant is used for removing hair or for any other purposes in these Colonies.

WEST INDIAN FISHERIES.

The Tarpon.

One of the best of game fishes in the tropics is the Tarpon. Although not much has been written on the occurrence of this fish in West Indian waters it is important for winter visitors to know that tarpon fishing, as good as that in Florida, could be had here by those who are keen on the subject.

It is not proposed, at present, to do more than mention the tarpon as a West Indian fish and suggest to those, who are in a position to do so, to communicate the results of their own experience for publication in these columns.

The following interesting particulars have been received from the Hon. Louis J. Bertram, Auditor-General of Jamaica, formerly Auditor of the Windward Islands :—

"I understand you want to know something about Tarpon. This magnificent fish is found all over the West Indies under the following names 'Kuffum' in Demerara, 'Grande Ecaille' in Grenada and the French Islands and Tarpon elsewhere. We in Jamaica have landed them with the rod up to 85 pounds, but much bigger ones have been caught in nets. They are found in the sea, in creeks, in rivers and in salt ponds. Levera Pond, Grenada, is full of them and also Lake Antoine. It would be interesting to prove the latter statement as it seems a mystery how they could ever have found their way into that extinct crater. Their bony scales make it extremely difficult to gaff them, the safest place being in the gill. I landed one for Captain Montgomerie that way the other day, also the 85 pounder previously mentioned. We have caught them with whitebait, grey mullet, fly and prawn. By the way, I forgot to mention that you have lots of them in Barbados. The favourite food of the Tarpon is certainly whitebait, and it was a lovely sight to see them taking the handfuls that we threw them from the stern gallery of H.M.S. "Charybdis." Any further information you may desire I shall be very happy to give you."

Advantages of Budded or Grafted Orange Trees

The advantages of growing budded or grafted orange trees of approved merit in the place of seedlings are shown in many ways, such as the early fruiting of the tree ; its freedom from thorns ; ease with which the tree can be pruned ; the improved quality of the fruit, especially as regards a smaller proportion of rag and absence of seeds ; the regular bearing of the trees ; uniformity of shape and grade, etc.: whereas in the case of seedling trees, though they often produce fruit of high flavour and especial merit, they are usually very thorny ; slow to come into bearing ; irregular bearers, carrying a heavy crop one year and a small crop the next, and the fruit possesses numerous seeds and is full of rag, as well as being uneven in grade and shape. Inferior seedlings are not worth propagating, as the fruits are usually of poor flavour, have a heavy skin, and are full of rag and seeds : in brief, they are not worth cultivating, as they cannot compete in the open market against better varieties.—*(Queensland Agricultural Journal.)*

SCREW WORM AT ST. LUCIA.

An insect pest of some importance is now at work in St. Lucia among cattle and domestic animals. This is the fly known as the 'Screw Worm,' the maggot of which infests cuts, bruises, etc., on living animals, sometimes causing their death. The insect is known to range through South America northwards as far as Canada, though but few of the West Indian Islands appear to suffer from it. Trinidad and St. Vincent are known localities for the fly and St. Lucia is now suffering from a somewhat serious outbreak. Probably the attacks in St. Lucia will lessen if care is taken to check the increase on living animals, by dressing all wounds and exposed spots on cattle with antiseptic and strong smelling dressings. Every stock owner in the West Indies should know of the presence of this pest which may possibly extend its ravages to neighbouring islands, and it will be well to bear this disease in mind and be able to treat it. A summary of what is known of the insect and its habits in St. Lucia has been published as Pamphlet No. 14 of the Department Series. This can be obtained from the local agents of the Department, a list of whom is given on the last page of this paper. This information will prove useful to all who are interested in cattle and domestic animals in these islands. The pest need not be feared if its attack is recognised and the simple precautions found useful in St. Lucia and elsewhere are adopted in good time

AGRICULTURE IN BRITISH HONDURAS.

The new Colonial Secretary (Mr. P. C. Cork, formerly of Jamaica) has, already, shown a deep interest in agricultural matters in British Honduras. Recently at a meeting, with the Governor in the chair, he read a paper entitled "Hints on Agricultural development" containing useful information in regard to the cultivation of cacao and coffee, pine-apple and other plants. He also touched on drainage, the selection of seed, gathering and packing fruit and labour saving appliances. Mr Cork concluded as follows :—

'I find a very general impression here that agriculture does not pay. It certainly will not pay unless the agriculturist knows his business and does it. In other tropical colonies I have seen hundreds of thousands of people living solely by the cultivation of the soil. I have seen profits of from $50 to $100 per annum per acre made out of bananas and equal amounts made from cacao. I have seen sugar estates, a few hundred acres in extent, yield net profits of $25,000 in one year. But I have also seen failures : and I have no hesitation in saying that failures are in most cases due to the man who grew the crop and not the crop itself. The man who goes blindly to work suffers the calamities which overtake the blind, and he who has not energy and perseverance must not expect to reap the rewards of industry. If we can, as the result of this meeting, form a society for mutual assistance and instruction, and if we can set our people's minds to work, we will create enthusiasm and enthusiasm will prompt men to greater exertion resulting in increased prosperity to the community.'

THE CACAO BEETLE. *

This insect is familiar to cacao planters of Grenada and Trinidad, as one of the most serious pests of the cacao tree in those islands. Its habits and methods of attack were observed by Dr. Morris in Grenada and recorded in the *Kew Bulletin* for 1891, p. 148. The beetle is of a moderate size, black with white markings, having the long jointed antennae that characterise the longicorn family of beetles. Most of the beetles of this family are wood borers, a large number of species being found in the West Indies as in other tropical places.

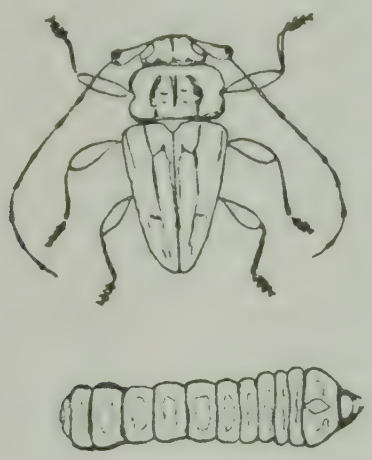

Fig. 3. Cacao Beetle and Grub.
Both natural size.

The habits of this beetle are similar to those of its allies. The female is easily recognised as being larger than the male, and lays its eggs on the bark. The grubs that hatch eat into the bark and later tunnel in the hard wood, growing finally to a considerable size and making a correspondingly large tunnel. This they fill with dust and refuse, and in old trees the presence of this dust on the bark is a sign of the presence of the grub in the tree. When this is seen, the grub should be killed. If it is near the surface it should be carefully cut out, and the hole tarred over; when it lies deeper a piece of stout wire may be used to extract it.

Should the grub be neglected, it will presently attain its full size and transform to the chrysalis inside its tunnel. This is the usual resting stage, when the body of the beetle is gradually built up from the materials stored up by the grub, and finally the perfect insect emerges. This, like many other beetles, is most active at night, flying strongly, and in the early morning the beetles may be found in a sluggish condition on the branches of the cacao trees. When they are plentiful they should be collected at this time. At Grenada, gangs of children do this work and the beetles are gathered, placed in a kerosene tin and killed by the application of a little kerosene.

The insect is recorded from Venezuela, Colombia, Surinam, British Guiana, Trinidad, Grenada, and Guadeloupe. Probably it occurs in other localities and cacao planters throughout the West Indies will do well to bear it in mind and check its attack as soon as it is observed.

* *Steirastoma depressum.* L.

GRAPE CULTIVATION IN JAMAICA.

The following observations on grape cultivation are taken from the Annual Report for 1901, of the Hon. W. Fawcett, B.Sc., F.L.S. Director of Public Gardens and Plantations, Jamaica:—

EXPERIMENTAL CULTURE.

Grape vines were cultivated for a few years at Hope on a fairly large scale for the purpose of obtaining definite information on certain points of importance. The questions to which answers were required were stated in the Annual Report for 1897, as follows:—

(1.) Which are the best varieties?
  (*a*) the heaviest cropper?
  (*b*) the finest looking grape?
  (*c*) the best traveller?

(2.) The best methods of training, whether on arbours, fences or otherwise.

(3.) The best method of root cultivation.

(4.) The best method of pruning.

The results obtained by Mr. Cradwick are as follows:—

(1.) (*a*) The heaviest cropper is what was provisionally called the 'Hope Wonder' which is the common black grape of the Savannahs, called in England Barbarossa.

The Muscat of Alexandria, and Liguanea are also very heavy croppers, but except at Shaftston have not been ripened satisfactorily.

(*b*) Barbarossa is, on account of its rich bloom and very large berries and bunches, the handsomest of all the varieties tried.

(*c*) Not having yet exported grapes we have not been able to ascertain which travel the best.

(2.) The arbour system is much the best; the vines in Jamaica cannot be restricted, and the great point in favour of the arbour system is that the bunches hang below the leaves, twigs and branches, and do not get rubbed by them when the breeze blows. With the other systems it is impossible to keep the leaves and twigs from rubbing the bloom off the bunches which of course irretrievably spoils their appearance.

(3.) The best method of root cultivation has proved a wide question. On dry gravelly places like Hope, subjected to dry winds, the roots should be kept as far below the surrounding level as possible. On badly drained lands the raised beds answer much better. Perfect drainage is the one thing that grape vines must have. On the dry deep red soil of the Savannahs little need be done, except to give as much water as possible, and mulch heavily, so as to keep the roots moist. Cow manure may be applied on any soil in unlimited quantities, its great value as a holder of moisture being quite as much in its favour as its manurial qualities. It has been found absolutely necessary to provide ample root space as the vine in Jamaica must be continually extended or it loses its vitality and becomes unfruitful.

(4.) The spur system, with such modifications as have been found necessary by experience to suit the different varieties, is the best. For instance with Barbarossa, (a rampant grower) many of the growths

are so strong that to attempt to prune them back to the orthodox one or two eyes would simply ruin them ; in some cases they have been left as long as 10 to 12 joints. Other growths can be cut back to one eye, even in some cases removed altogether. The same applies to Muscat. Then again the pruning is largely dependent on the state of the vine : if the resting season has been prolonged and dry, the vines can be pruned much closer than after a resting season which has not been as favourable. Some varieties seem to rest more completely under similar conditions than others, for instance, Alicante and Black Hamburgh. The Muscat and Barbarossa are nearly always growing slightly, but yet are the greatest croppers of all.

VIRGIN ISLANDS

Agricultural Efforts.

The Virgin Islands and their resources have hitherto received but little attention as compared with other portions of the West Indies. In 1899 a grant was made in their behalf by Parliament. As a result the Imperial Department of Agriculture directed its efforts to provide an Experiment Station and a centre of distribution for economic plants with a practical Agriculturist in charge.

The Station was started in November 1900 at the "Lower Estate" situated in a valley near to Road Town, in Tortola, and within a few minutes walk of the landing place. The property consisting of 165 acres, was purchased by the Imperial Department of Agriculture and an area of about 20 acres, adjoining the old sugar works, was set apart for experiment plots, nurseries &c. The remainder of the land was let to the former tenants of the Estate on special terms. The soil in some parts is fairly good and a moderate water supply is available, but only in the lower part of the estate.

The work during 1901 consisted of clearing the land and preparing the experiment plots. Attention was also given to planting wind-belts, deepening the water course which passes through the Station, constructing roads and drains and other work of this character. A nursery was also started and at the close of December 1901 it contained upwards of 200,000 limes and other economic plants.

A house for the Agricultural Instructor has since been provided and a small Chatanooga sugar-mill with an evaporator erected ; the latter, with the object of crushing the tenants' canes and enabling them to maintain themselves while establishing their lands in other and more permanent crops.

In order to improve the breed of ponies and small stock in the Presidency, a pony stallion and several sheep and fowls have been introduced by the Imperial Department of Agriculture. These are kept at the Experiment Station where suitable buildings have been provided for their accommodation.

In addition to the maintenance of the Station, the Agricultural Instructor is required to visit the holdings of small cultivators throughout the Virgin Islands and to assist and advise people generally with regard to the best methods of cultivating their lands.

Two courses of Lectures in Agriculture to Teachers in Elementary Schools were delivered by the Travelling Superintendent of the Department in September 1900 and November 1901. These were successfully carried out and greatly appreciated.

Two Agricultural Shows have been held at Tortola in July 1900 and September 1901.

The Experiment Station and all Agricultural Agencies in the Virgin Islands are supported out of the Agricultural Grant-in-Aid. The Imperial Commissioner of Agriculture and the Travelling Superintendent regularly visit this remote dependency and every effort is being made with the aid of the Commissioner, (Dr. Cookman) to assist the people to extend the cultivation of remunerative crops. Recently Mr. W. C. Fishlock, formerly of the Royal Gardens, Kew, has been appointed Agricultural Instructor of the Virgin Islands, and it is anticipated that the Experiment Station and other efforts will thus be strengthened and improved.

BOTANIC STATION TOBAGO.

This Station was started in June 1899 at Dealfair, a valley situated opposite the landing place at Scarborough. The site was selected in 1898 by the Imperial Commissioner of Agriculture and the Superintendent of the Royal Botanic Gardens of Trinidad. The soil is fairly good and there is a regular supply of water from a small spring on the land. The first year's work consisted of clearing and preparing the land, making roads, paths and drains and starting a nursery. The latter in 1899 contained 1600 economic plants. In 1899 and 1900 the laying out of the Station was greatly advanced. In the latter year the nursery was increased to 7,500 economic plants, of which 2,157 were sold, bringing in an income of £15. 7. 3. A large number of cacao and other plants were distributed free to settlers on Crown lands and others. Latterly, a house for the Curator, an office and a shelter for visitors have been provided. Also a new entrance rendering the Garden accessible from the landing place.

Attached to the Station is a travelling Agricultural Instructor whose chief duty it is to visit the holdings on Crown lands and advise and assist the settlers. About 500 acres are estimated to be now in course of being planted, by settlers, in cacao trees. The Agricultural Instructor also assists generally in promoting planting industries in the island.

The Station is mainly supported from the funds of the Imperial Department of Agriculture, but the grant is supplemented, to some extent, by the Government of Trinidad. The Curator and Agricultural Instructor are departmentally under the Superintendent of the Royal Botanic Gardens at Trinidad. The Station is occasionally visited and inspected by the Imperial Commissioner of Agriculture.

EDUCATIONAL

Barbados.

The following reports on the result of the Examinations in Natural Science and Agriculture, held in December last, at Harrison College have just been published. The satisfactory character of these reports is admitted, to be largely due, to the assistance given by the Imperial Department of Agriculture in providing a Lecturer in Agriculture to the Science Department at Harrison College. It is, however, very gratifying to learn that Professor d'Albuquerque and his colleagues, according to the Cambridge Examiner, are now "supplying a training of the highest value in Agricultural Science."

To the Secretary of the Local Examinations and Lectures Syndicate of the University of Cambridge.

SIR,

I beg to present to you a report of my recent examination of the Harrison College, Barbados, in several branches of Natural Science.

A paper on Practical Chemistry was set to each of two divisions. In the case of the Upper Division the work consisted of fairly advanced Qualitative and Volumetric Analysis ; and in the case of the Lower, of Elementary Qualitative Analysis. I was pleased to find that these subjects had been most carefully and efficiently taught. The methods used, the results obtained, and the system and style of the written description of the work, were alike excellent in almost every case. I am convinced that the subject has been so taught as not only to make the candidates accurate analysts, but also to impart a sound knowledge of the scientific principles underlying the methods employed in the laboratory.

The Theoretical Paper on Agricultural Chemistry was again well done, and marks obtained were uniformly high.

The answers to the paper on Agricultural Botany showed that this subject had been as efficiently taught and as intelligently studied as that of Chemistry. Almost all the questions were well done.

The least satisfactory work submitted to me was in Agricultural Physiology and Entomology. The highest mark obtained was 79 per cent., a very creditable total to which several candidates approximated. But marks as low as 16 and 27 were awarded, and five of the papers failed to secure 'half marks.' One cannot therefore bestow upon the work in this department the same unqualified praise which that in the other subjects so well merited. I should mention that through a misunderstanding I omitted to set a paper of questions in this subject, thinking it to have been included amongst the more technical subjects the examination of which was entrusted to another examiner. Such a paper was however set in Barbados by the Professor of Chemistry, and the answers were looked over and marked by myself.

The college is certainly to be congratulated upon the results of the Examination ; it would seem to have been making rapid progress in standards and efficiency, and in supplying a training of the highest value in Agricultural Science.

I have the honour to be, Sir,

Your obedient Servant,
(Signed) F. R. TENNANT, M.A.,
Gonville and Caius College, Cambridge.

12 February, 1902.

GENERAL REPORT.

On Examination in Agriculture held at Harrison College, Barbados, December 1901.

The five candidates have all passed, obtaining from 54 to 68 per cent. of the total marks obtainable. A very uniform standard was maintained throughout. The Paper on 'Principles of Agriculture' was well done, showing that the subject had been carefully taught and an intelligent grasp of the subject had been obtained. I was disappointed in the local and tropical information sent in, and think more attention should be given to tropical conditions in studying this subject. The Technical Tropical Agriculture was fairly done, but I expected greater detailed knowledge. Perhaps it would be well to supplement the text books available by a little more up-to-date technical information. In 'Tropical Agriculture' the Yam and Cocoa were well handled, but the information on Bananas and Pines was almost valueless. I would suggest the inclusion of papers in the *Agricultural Journals* of the West Indies as a desirable addition to the standard text book in this subject. The Practical Chemistry was well done throughout in method. Two students attained a good standard of accuracy in the results. On the whole, the results are very gratifying as proving the possibilities of Agricultural Education in the West Indies.

HERBERT H. COUSINS, M.A., F.C.S.,
Examiner.

January 14 1902.

British Guiana.

The Inspector of Schools has issued in a separate form an Essay written by Mr. T. Bruce James at an Examination in Agricultural Science held at Queen's College, Georgetown, in January last.

After referring to the educational value of scientific teaching in developing the faculty of observation, in training the reasoning faculty, in inducing the habit of attention to details, and in awakening a spirit of inquiry the writer passes on to the practical effects of teaching Agricultural Science to children as follows :—

Agricultural study in school introduces children to the cultivation of the soil in a pleasant manner, and is likely to leave the two happily associated when childhood has passed into manhood and the stern realities of life have to be faced. It is, therefore, calculated to produce in the rising generation an improved disposition towards Agricultural pursuits, and a wise determination to make the fullest use of the advantages with which benign Nature surrounds them. And when they have turned to farming, the principles they had learnt in childhood, and which they will now be able to apply to practical agriculture, may save them from serious errors which those who preceded them may have made in consequence of lack of knowledge. Knowing that in Agriculture as in other branches of human industry there is a cause for everything, they will probably put more brains into their work than would otherwise have been given to it ; while the rich legacy of knowledge which will be theirs to enjoy, will put them on vantage ground for the proper treatment of the soil and of their crops, enabling them not only to ameliorate present conditions, but to hand down to posterity possibilities of wealth that may lead to such an era of prosperity as the most optimistic dreamer had not ventured to anticipate.

Trinidad.

The following interesting remarks, on the need of agricultural education, are taken from *Little Folks' Trinidad,* a short descriptive historical and geographical account of the island compiled for use in the schools of the Colony (Port-of-Spain ; Davidson and Todd, 1901):—

'Since the material prosperity of the people mainly

depends on the produce of the soil, how saddening it is to see that agriculture is still in a backward state. It is true that cultivation is daily extending more and more, but it is painful to see that the average planter is not a bit wiser than his great grandfather was, and is still ignorant of the simplest laws of husbandry. The sugar planters and the owners of large cacao estates pay attention to improved methods in tillage, and invoke the aid of science to their assistance; but the peasant proprietors usually cultivate their holdings with the greatest disregard to the most palpable teachings of agricultural science, and for the most part solely depend on nature for the growth and improvement of their products.

With a view to instruct the people in the elements of scientific husbandry, the Government has introduced the subject of agriculture into the public schools of the island. This is, indeed, the wisest step which could have been taken towards the welfare of the inhabitants of Trinidad, and to ensure the solid progress of this fine Colony. It is to be hoped that the rising generation, in whose interest this has been done, will take advantage of the *great boon.*

Ignorance of the noble science of agriculture has hitherto created an aversion for the dignified occupation of the husbandman. Let us hope, then, that as this interesting science becomes better known, the people will learn to regard agriculture as the most manly profession they can possibly follow.'

MOSQUITOES AND MALARIA.

The following extract is taken from Circular No. 25, issued by the Royal Botanic Gardens, Ceylon:—

To Laveran (a distinguished French physician) is given the credit of having first discovered the micro-organism in the blood of persons suffering from malaria. Manson, an English doctor famous for his studies in tropical disease, definitely formulated the theory suggesting the relation in which the mosquito might stand towards malaria. Major Ross of the Indian Medical Service, demonstrated the correctness of the theory, which has since been corroborated and amplified by several Italian scientists, notably by Celli, Grassi, Bignami, and Ficalbi.

It would be difficult to name any biological discovery that has been worked out more carefully and patiently to its conclusion. The development of this microscopic blood-parasite has been traced,—stage by stage,—first in the blood of man, then through the stomach and tissues of the mosquito, till it reaches such a position that it must inevitably enter the human system when next the mosquito takes its draught of human blood.

Negative proof of the correctness of the mosquito theory of infection is afforded by the fact that Doctors Sambon and Low lived a whole summer in the deadliest part of the Roman Campagna, escaping infection by retiring each night into a mosquito-proof hut.

Celli made practical experiments on railroad employés in Italy. A certain number of these were protected by the use of mosquito-proof dwellings, and almost completely avoided the fever which attacked a large majority of the unprotected men.

Positive proof has been provided by the well-known case of the deliberate infection of Dr. Manson's son, who permitted himself to be bitten, in England, by infected mosquitoes specially imported from the malarious districts near Rome; with the result that an attack of the typical form of Roman fever was induced thereby.

DEPARTMENT NEWS.

Mr. W. C. Fishlock has been appointed by the Secretary-of-State, on the recommendation of the Imperial Commissioner of Agriculture for the West Indies, Agricultural Instructor for the Virgin Islands, to date from April 1, 1902. Mr. Fishlock was trained at the Royal Gardens, Kew, and latterly has been attached to the Gardens at Kensington Palace. Before proceeding to the Virgin Islands, Mr. Fishlock is spending a short time at Dominica in studying tropical planting as carried on in that island.

Mr. Francis Watts has lately been engaged, with Mr. Lunt, in taking off the canes and analysing the juice from the Experiment sugar-cane plots in the island of St. Kitts. The results, which will require some time to work out, will be published in the yearly report to appear in the autumn of this year. Mr. Watts' last report published in two parts was regarded as a very valuable document. A summary of it appeared in Pamphlet No. 12 of the Department Series: *Seedling and other canes in the Leeward Islands 1900-1901.*

It is not improbable, though not yet definitely settled, that the next West Indian Agricultural Conference, in January 1903, will assemble at Trinidad. This Colony is, just now, the most prosperous of any in the West Indies and it offers special features of interest to scientific and technical visitors. Sir Alfred Moloney, the Governor, who has for many years taken a deep practical interest in agricultural development, and left his mark in every Colony he has administered, is prepared to offer a hearty welcome to the members of the Conference and to assist in the arrangements. Altogether a Conference at Trinidad should be thoroughly successful and tend to advance the general interest of scientific agriculture in the West Indies.

BATS IN HOUSES AND CHURCHES.

The following note by the Rev. Canon Ellacombe is contributed to *The Country*, for March, 1902:—

'In many country houses, and in many churches, bats are an offensive nuisance, and it is not easy to get rid of them. But they can be cleared out of any house or Church by following a very simple plan grounded on a knowledge of their natural habits. If there are bats in a church, open the doors on a fine summer evening about dark; the bats will go out hawking for insects. In half an hour's time close the doors. Most of the bats will still be outside and unable to get in. Repeat this on other evenings, and little by little the bats will be fewer and fewer, and will find roosting-places elsewhere.'

RECENT REPORTS.

Jamaica. Annual Report of the Public Gardens and Plantations, 1900-1901. By W. Fawcett, B.Sc., F.L.S., Director.

This Report contains valuable notes on cultivated plants. The Banana industry is steadily increasing. The exports for the year ending 31st March 1901 were over eight million bunches, of the value of £618,636. Experiments at Hope Gardens show that the Navel Orange, on rough lemon or sour orange stock, and the Grape fruit are suited to the dry hot plains of Jamaica. About 70,000 plants and seeds of cacao were distributed. Tho Guango tree (*Pithecolobium Saman*) is recommended as a good shade-tree for coffee in the plains. Nutmegs are being grafted and 70 plants were established during 1901. Rice seed of various varieties was obtained from Calcutta. About three and a half acres containing 62 varieties of sugar canes were maintained. Cane D. 95 is regarded as very promising. Mr. Fawcett reports that there is a general awakening to the belief that Sugar should again be made a staple crop in Jamaica. There is a large demand for new canes and 15,617 plants were distributed in 1901. An experiment with tobacco was tried with $2\frac{3}{4}$ acres on a heavy soil and $1\frac{1}{4}$ on a light soil. The services of a Cuban tobacco planter were engaged to cure the crop. The practical instruction to pupil apprentices, to boys at the Hope Industrial School, to teachers in Elementary Schools and students at the Training Colleges was continued on extended lines. Much good is being done by these means. Altogether Mr. Fawcett shows in this report an excellent record of usefulness and Jamaica owes a great deal to the admirable Department under his charge.

Barbados: Report of the Agricultural work for 1898-1901 carried on under the direction of the Imperial Department of Agriculture by Professor J. P. d'Albuquerque, M.A., F.I.C., F.C.S. and Mr. J. R. Bovell, F.C.S., F.L.S., 1901.

This is a bulky volume of 178 pages entirely devoted to an account of the raising of new seedling canes, in testing these and other canes under estate conditions and in careful research into the effects of artificial and other manures. Also in estimating the value of certain leguminous crops as animal fodder and green dressings.

The information contained in this report has already been summarised in Pamphlet No. 3, *Cultivation of Seedling and other Canes at Barbados, 1900* and in the *West Indian Bulletin*, Vol. ii, pp. 23-26. Also in Pamphlet No 10, *Experiments with Manures and Leguminous plants at Barbados 1898-1901.*

The manurial experiments were carried on at Dodds Reformatory (St. Philip), at Belle estate (St. Michael), and Hopewell estate (St. Thomas). The Experiments with seedlings and other canes were made at local Stations in the parishes of St. Michael, St. Philip, Christ Church, St. John, St Joseph, and St. Lucy. The Experiments with Leguminous plants were carried on at Waterford estate (St. Michael).

The land required for these Experiments, containing in the aggregate 80 acres, was placed at the disposal of the Imperial Department of Agriculture by the planters, free of cost, and the cultivation was carried on, in each case, under normal estate conditions.

It is impossible after a careful perusal of this Report to fail to appreciate the valuable services rendered by the indefatigable labours of Messrs. d'Albuquerque and Bovell. Both these eminent investigators have devoted many years in the endeavour to assist the sugar planters in Barbados and it is confidently anticipated that these, as well as the further experiments now in hand, will prove of permanent benefit to the sugar cane industry.

WORKS OF REFERENCE.

The Butterfly Book by Dr. W. J. Holland. (New York, Doubleday, Page & Co. 12s. 6d. net.)

Dr. Holland is to be congratulated upon having brought out this beautiful book on the butterflies of North America, thereby placing this part of the insect world within the reach of every one interested in Natural History.

There are few books on insects which appeal to the unscientific reader, without bewildering him with technicalities or lengthy latin names, but we certainly place this among the foremost as a book that everyone can pick up and enjoy. A notable feature of the book is the numerous coloured plates, which are exact photographic reproductions of the appearance of the insects, unmarred by the idiosyncrasies of the artist.

There need be no difficulty in recognizing the numerous butterflies common to the Southern States and the West Indies, and the book may serve equally as a help to the collector and a genuinely interesting account of this popular order of insects. The book should find a place in public libraries throughout these islands, both as a reference book for those in search of information and as a book likely to encourage a love for nature and a taste for the beautiful. Were there space we would quote some of the delightful sketches and poems that close the chapters; but we must rest content with commending this book to the notice of the reading public generally.

The Insect Book by Dr. L. O. Howard. (New York, Doubleday, Page & Co. 12s. 6d. net.)

This book is a companion volume of the preceding, and forms the second of a series of four which are designed to deal popularly with the insect world as found in the United States. Dr. Howard discusses the insects not included in butterflies, moths and beetles; he takes the reader through those little known and difficult groups of insects including the bees, wasps and ants, the flies, the bugs, the dragonflies and all the miscellaneous orders of insects which bewilder the student of entomology. With each group are plates, plain and coloured, forming accurate photographic representations of a large number of insects, comprising many West Indian species found also in the Southern States.

The subject is treated with a simplicity that makes the book read more like a novel than a scientific account of so many complex groups of insects. The curious habits and customs of the insects, their manner of providing for their young, their ever varying and beautiful instincts, all are here discussed in plain language such as all can understand. For the student as for the unscientific reader, the book is one to be kept for reference and for enjoyment; what has been said of Dr. Holland's 'Butterfly Book' applies equally to this, and we hope the high standard of these two volumes may be maintained in the 'Moth Book' and the 'Beetle Book' which are needed to complete the series.

There are few books dealing popularly with the insect world and none combine in a better form simplicity, interest,

and thoroughly up-to-date knowledge. These are the only books that give in a concise and readable form reliable information concerning the insects of these islands ; and for this reason, as much as for their excellence, we commend them to the general reader in the West Indies.

CACAO DISEASE IN SURINAM.

The following Proclamation, dated April 3, 1902, has been issued at St. Lucia against the importation of cacao seeds or plants from Surinam and other parts of South America :—

'Whereas it has been represented to me by the Imperial Department of Agriculture for the West Indies that a fungoid disease known as the 'WITCH BROOM,' is a serious enemy to Cacao plantations and it is important that the disease should be kept out of all the Cacao-growing areas in the West Indies.

And whereas the said disease has lately appeared in Surinam and is believed to be gradually spreading over Cacao cultivated areas on the Continent of South America.

Now, THEREFORE, I., HARRY LANGHORNE THOMPSON, Knight Commander of the Most Distinguished Order of Saint Michael and St. George, Administrator of the Government of the Island of St. Lucia, in virtue of the power and authority in me vested by the Plant Protection Ordinance, 1895, do hereby prohibit, from the date hereof and until further notice, the importation into this Colony, directly or indirectly from the Continent of South America, East and South of the Isthmus of Panama, of any Cacao plants or parts or portions whatever of a Cacao tree.'

Similar Proclamations are being issued in other Colonies.

HAND-BOOKS TO THE WEST INDIES.

The following Hand-books afford interesting information of a descriptive, statistical and general character respecting the West Indies. They also contain particulars respecting the imports and exports and the agricultural resources of the Colonies enumerated :—

HAND-BOOK OF JAMAICA FOR 1902, comprising Historical, Statistical and General Information concerning the Island. Twenty-second year of publication. London : Edward Stanford, 26 and 27 Cockspur Street. Jamaica : Government Printing Office, Kingston.

BRITISH GUIANA DIRECTORY AND ALMANACK for 1901. Georgetown, Demerara : C. K. Jardine.

TRINIDAD AND TOBAGO YEAR BOOK, 1902. Thirty-seventh year of issue. Compiled by James Henry Collens. Port-of-Spain : Muir, Marshall & Co.

THE MIRROR ALMANACK AND GENERAL COMMERCIAL DIRECTORY OF TRINIDAD AND TOBAGO. Port-of-Spain : Mole Brothers.

THE GRENADA HAND-BOOK, DIRECTORY AND ALMANACK FOR THE YEAR 1902. Compiled by the Colonial Secretary. London : Sampson Low, Marston & Co., Ltd.

THE ST. LUCIA HAND-BOOK, DIRECTORY, and ALMANAC FOR 1902. Compiled by Everard G. Garraway, Castries, 1902.

THE BARBADOS DIRECTORY AND WEST INDIAN GENERAL ADVERTISER, 1901. Compiled by S. J. Fraser. Bridgetown, Barbados : King & Co :

LIGHTBOURN'S WEST INDIAN DIRECTORY AND COMMERCIAL DIRECTORY. J. N. Lightbourn, St. Thomas.

AGRICULTURAL INSTITUTIONS IN THE WEST INDIES.

Jamaica Board of Agriculture : *Chairman* : The Hon'ble Sydney Olivier, C.M.G.; *Secretary* : W. R. Buttenshaw, M. A., B.Sc. ; *Publication*—Occasional Bulletin.

Jamaica Agricultural Society (with thirteen affiliated Branches). Kingston, Jamaica. *President* : Sir Augustus W.L. Hemming, G.C.M.G. *Deputy Chairman* : Hon'ble Wm. Fawcett, B.Sc., F.L.S. *Secretary* : John Barclay. *Publication* : "Journal of the Jamaica Agricultural Society."

Royal Jamaica Society of Agriculture & Commerce & Merchants' Exchange, Kingston, Jamaica. *President* : Hon'ble Lieut-Colonel Ward, C.M.G. *Secretary* : J. L. Ashenheim. *Publication* : Annual Report.

The Institute of Jamaica : Kingston, Jamaica. *Chairman* : Sir Fielding Clarke. *Secretary* : Frank Cundall, F.S.A., *Curator of Museum* :———*Publications* "Journal of the Institute of Jamaica." "Jamaica in 1901."

Kingston & St. Andrew Horticultural Society. Kingston, Jamaica. *President* : Hon'ble Wm. Fawcett, B.Sc. *Secretary* : William Harris, F.L.S.

British Guiana Board of Agriculture, Georgetown, Demerara. *Chairman* : Hon'ble A.A. Ashmore, C.M.G. *Deputy Chairman* : J. B. Harrison, C.M.G., M.A., F.I.C., F.G.S., F.C.S. *Secretary:* Oscar Weber.

British Guiana Royal Agricultural & Commercial Society Georgetown, Demerara. *President* : Luke M. Hill, B.A., M.I.C.E. *Secretary* : Thomas Daley. *Local Secretary* : (Berbice,) Dr. C. F. Castor. *Assistant Secretary and Librarian* : J. Rodway, F.L.S.. *Curator of Museum* : Richard Evans, M.A., B.Sc., *Publication* : "Journal of the Royal Agriculture and Commercial Society of British Guiana."———

Trinidad Agricultural Society, Port-of-Spain, Trinidad. *President* : Sir Alfred Moloney, K.C.M.G. *Secretary* : Edgar Tripp. *Publication* : "Proceedings of the Agricultural Society of Trinidad."

Grenada Agricultural Society, St George's, Grenada. *President* : Sir Robert B. Llewelyn, K.C.M.G. *Secretary:* W. E. Broadway. *Publication* : Minutes of Meetings.

Barbados General Agricultural Society & Reid School of Practical Chemistry, Bridgetown, Barbados. *President* : Sir. George C. Pile, Kt. *Secretary* : J. H. Poyer. *Publication* : "Barbados Agricultural Gazette and Planters' Journal."

St. Lucia Agricultural Society, Castries, St. Lucia—*President* : Sir H. L. Thompson, K. C. M. G. *Secretary* : R. G. McHugh.

Dominica Agricultural Society, Roseau, Dominica. *President* : The Hon'ble Hesketh H. Bell. *Secretary* : E. A. Agar.

Antigua Agricultural Society. *President*———*Secretary* : W. N. Sands.

St. Kitts-Nevis Agricultural Society. *President :* Honourable E. G. Todd. *Secretary :* C. A Smith.

[Further particulars of Agricultural and Horticultural Institutions in the West Indies would be gladly received for this list. Also fixtures for Agricultural Shows for 1902.]

LAWN MOWINGS AS MANURE.

The value of dead leaves and other vegetable matter as a means of increasing the fertility of the soil has often been insisted on in publications of the Department. The following extract from the *Gardeners' Chronicle* for January 11, 1902, indicates the value of a too often neglected 'waste product':—

'A gardener having an accumulation of rotten grass which had been deposited in a heap when the lawn was mown, tested its value as manure, and he found it to be a very strong and efficient fertiliser. Since that he has always had set aside the mown grass as manure, instead of taking it to the rubbish heap, as is the custom with many.'

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is desirable that inquiry be made, beforehand, as to the terms on which such produce will be received, and whether the market is favourable or not.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—
B. S. Bayley, Water Street, Georgetown.
TRINIDAD—
J. Russell Murray, Port-of-Spain.
BARBADOS—
T. S. Garraway & Co., Bridgetown.
ST. LUCIA—
Captain H. Henville, Contractor and Agent, Castries.

MARKET REPORTS.

London, April 1, 1902.—Messrs. J. Hales Caird & Co., and Gillespie Bros. & Co.

Aloes—Socotrine 80/- per cwt. Cape, 30/- to 36/- per cwt.
Bees Wax—Jamaica, £7. 12. 6. to £8. 0. 0. per cwt.
Cacao—Grenada fair to good 56/- to 60/6 per cwt. Trinidad 65/- to 70/- per cwt.
Cardamons—Mysore 1/2 to 3/- per lb.
Coffee. Jamaica good ordinary, 36/- to 39/. Fair 60/- to 65/-. Costa Rica good to fine 88/- to 105/- per cwt. Peaberry 103/- to 110/- per cwt.
Ginger—Jamaica Bold dark, 40/- per cwt. Fair and clear 45/- to 53/6 per cwt.
Honey—Jamaica in barrels 13/6 to 17/- per cwt. In tins 15/- to 20/- per cwt.
Lime Juice—Raw 1/- to 1/2 per gallon. Concentrated £12 per pipe.
Mace—1/4 to 1/7 per lb.
Nutmegs—10d. to 2/- per lb.
Oil of Limes—Dominica distilled 1/- per lb. Hand pressed 4/4 per lb.
Pimento—2¾d. to 3d. per lb.
Rubber—Para, 2/1 to 3/2 per lb. Central American 1/8 to 2/4 per lb. African 1/11 to 2/9 per lb.
Sugar—Crystals, 15/9 to 16/ per cwt.
Muscovado—nominal.
Molasses—nothing doing.
Tamarinds—14/- per cwt.
Logwood—No sales.
Fustic—No sales.

New York,—March 21, 1902.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaicas, 9 hands $1.05 to $1.10, 8 hands 75c. to 80c. per bunch.
Cacao—African 12¾c. to 13c. Caracas 14½c. to 15¼c. Grenada. 12¼c. to 12⅝c. Jamaica 11c. to 11¾c. Trinidad 13½c. to 14¼c. per lb.
Cocoa-nuts—Jamaicas $21.00 per M. Small Trinidads $14.00 per M.
Coffee—Good ordinary Rio 5⅝c. and fair quality Jamaica @ 6c. to 7c. per lb.
Ginger—Ordinary to small medium 7c. to 8c. per lb.
Pimento—Good quality 5¾c. per lb.
Rubber—Nicaragua Scrap 50½ to 51c. per lb.
Guayaquil Strip 44c. to 48c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—April 12, Messrs. T. S. Garraway & Co.

Arrowroot—good quality, $2.75 per cwt.
Cacao—none in market.
Coffee—Jamaica and Rio $9 to $10.25 per 100lb.
Hay—$1.30 per 100lb.
Molasses—8c. per gallon and $4.00 for package.
Onions—$4.00 per 100lb.
Potatos—Nova Scotia $1.75 to $2.00. Bermudas $3.50 per barrel.
Rice—Ballam $4.50 per bag. Patna $3.75.
Sugar, Muscovado, in hogsheads, $1.05 per 100lb. and $5.00 for hogshead
in bags,—$1.25 per 100lb.

British Guiana—March 27, 1902. Messrs. Weiting & Richter.

Arrowroot—$6.50 per barrel.
Cacao—(nominal) 11c. to 12c. per lb.
Cassava Starch—$5.00 per barrel
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica 12c. to 13c. per lb.
Eddoes—$1.20 per 100lb.
Onions—Lisbon (retail) 4c. to 5c per lb.
Pea Nuts—American (retail) 4½c. to 5c. per lb.
Plantains—24c. to 40c. per bunch.
Potatos English—$2.00 to $2.50 per barrel.
Rice—Ballam $4·90, Patna $5.65 per bag.
—Creole Rice 20c. per gallon, retail.
Sweet Potatos—$1.20 per 100lb.
Tannias—$1.20 per 100lb.
Yams—$2.00 per 100lb.
Molasses—First Yellow 17c. per gallon including package.
Sugar—Dark Crystals $1.65 per 100lb. Yellow Crystals $2.25 to $2.40 per 100lb.
Timber—Greenheart 32c. to 40c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00. per M.

Trinidad. March 26, (Messrs. Gordon, Grant & Co.)
March 27, (Messrs. Rust, Trowbridge & Co.)

Cacao—$13.00 to $14.00 per cwt.
Coffee—(Venezuelan) 7½c. per lb.
Hay—(scarce) $1.40 per 100lb.
Onions—(retail) 3c. per lb.
Potatos English—$1.60 to $1.65 per 100lb.
Rice—Ballam $4.70. White Table $5.75 per bag.
Molasses—12c. per gallon and $5.00 for package.
Sugar—(for local consumption). Yellow Crystals $2.20 to $2.40 per 100lb.

Publications on sale of the Imperial Department of Agriculture

FOR THE WEST INDIES.

The "WEST INDIAN BULLETIN." A Quarterly Scientific Journal.

Volume I contains full reports of the West Indian Agricultural Conferences of 1899 and 1900; also papers on Moth-borer, Sugar-cane experiments, Agricultural education, Cacao diseases, etc.

As only a very limited number of copies of this Volume are now available, the parts can no longer be sold separately. Volume I complete, in the original paper covers as issued, post free, 5s.

Volume II contains the report of the Conference of 1901, with the President's Address, papers onthe Sugar Industry, General and Educational subjects in full. Amongst the topics treated of are Recent Experiments with Sugar-cane, Sugar-cane diseases, Rubber planting in the West Indies, West Indian Fisheries, Cacao diseases, Rice, Sweet potatos, Citrate of Lime, etc. The Volume is illustrated by two coloured plates and other illustrations.

Price in original paper covers as issued, post free, 2s. 9d.

Volume III. Number 1. Agricultural Conference of 1902; President's Address, Minutes of the proceedings and papers relating to the Sugar Industry and Agricultural Boards, and the Report of the Chemical Section.

Price 6d. Post free.

Number 2. Conference of 1902 (continued). Educational papers, etc. (In the press).

PAMPHLET SERIES.

The Pamphlets are written in a simple and popular manner and the information contained in them is especially adapted to West Indian conditions. They contain amongst other subjects, summaries of the results of the experiment work on sugar-cane and manures, the full official reports of which have only a limited circulation. The following list gives particulars of all the pamphlets which are still available. The missing numbers are out of print and can no longer be supplied:

(3.) Seedling and other Canes at Barbados 1900. Price 2*d*. Post free 2½*d*.
(5.) General Treatment of Insect Pests, 2nd Edition Revised. Price 4*d*. Post free 4½*d*.
(6.) Recipes for cooking Sweet Potatos. Price 2*d*. Post free 2½*d*.
(7.) Scale Insects of the Lesser Antilles. Price 4*d*. Post free 5*d*.
(8.) Cultivation of Vegetables in Barbados. Price 2*d*. Post free 2½*d*.
(9.) Bee-keeping in the West Indies. Price 4*d*. Post free 5*d*.
(10.) Manures and Leguminous Plants at Barbados, 1898-1901. Price 4*d*. Post free 5*d*.
(11.) Hints for School Gardens. Price 2*d*. Post free 2½*d*.
(12.) Seedling and other Canes in the Leeward Islands, 1900-1901. Price 2*d*. Post free 2½*d*.
(13.) Seedling and other Canes at Barbados, in 1901. Price 4*d*. Post free 5*d*.
(14.) Screw worm in Cattle at St. Lucia. Price 2*d*. Post free 2½*d*.

'NATURE TEACHING.'

A text-book based upon the general principles of Agriculture for the use of schools, prepared by the Honourable Francis Watts and others. (Pages XII to 199) The Plant, the Soil, Plant food and Manures, Weeds, and Insects are successively treated, and the information given is illustrated throughout by simple experiments which can readily be carried out in an ordinary school. The Book is mainly intended for the use of Teachers. Price, limp cloth 2*s*., or in a superior style of binding 2*s*. 6*d*. Postage, in either binding, 3½*d* extra.

The "AGRICULTURAL NEWS" A Fortnightly Review.

The "AGRICULTURAL NEWS" will contain extracts from official correspondence and from progress and other reports; notes on interesting points connected with the work carried on at the Government Laboratories, Botanic Stations, Experiment Stations, Agricultural Schools, Experiment plots, School plots, Agricultural shows, Lectures to teachers, etc., the occurrence of disease, the arrival of new plants and animals, the flowering and fruiting of plants of special note, the appointment, promotion and removal of officers, the weather, and, in fact, any information indicating what is going on in each Colony and the progress made in Agricultural matters throughout the West Indies.

The "AGRICULTURAL NEWS" will be printed in time to be distributed, regularly, by each mail, and will be on sale by the local agents of the Department at one penny per number. The subscription price, including postage, is 1*s*. 1*d*. per quarter, 2*s*. 2*d*. per half-year, or 4*s*. 4*d* per annum. The work of distribution is intended to be carried on mainly by the local agents or through the post.

Agents.

The following have been appointed agents for the sale of the publications of the Department:—

London: Messrs. Dulau & Co., 37, Soho Square, W. *Barbados*: Messrs. Bowen & Sons, Bridgetown. *Jamaica*: The Educational Supply Company, 16 King St., Kingston. *British Guiana*: Mr. C. K. Jardine, 'Daily Chronicle' Office, Georgetown. *Trinidad*: Messrs. Munro, & Co., Frederick St., Port-of-Spain. *Grenada*: Messrs. F. Marrast & Co., 'The Stores,' St. George. *St Vincent*: Mr. W. C. D. Proudfoot, Kingstown. *St. Lucia*: Mr. R. G. McHugh, Castries. *Dominica*: Messrs. C. F. Duverney & Co., Market St., Roseau. *Montserrat*: Mr. W. Llewellyn Wall, Plymouth. *Antigua*: Mr. F. Forrest, St. John's. *St. Kitts*: Messrs. S. L. Horsford & Co., Basseterre.

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A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. I. No. 2. BARBADOS, MAY 10, 1902. PRICE 1*d*

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Boards of Agriculture.

AT the recent West Indian Agricultural Conference an interesting account (since published in the *West Indian Bulletin* Vol. III, pp. 93-96) was given of the formation of Boards of Agriculture at Jamaica and British Guiana. The creation of these Boards is an important event in the agricultural history of the West Indies. Several valuable organizations, Botanical, Chemical and others, existing in these Colonies have hitherto been working on independent lines, and much time and energy have been lost. The object of the Boards of Agriculture is to combine all the functions of these organizations, bring them under the immediate cognisance of the Government and promptly put them into practice. The fundamental difference between, a Board of Agriculture and an Agricultural Society, is that the former is an administrative Department with power to control public officers and furnished with funds voted by the Legislature. An Agricultural Society, on the other hand, may or may not include scientific and technical officers in the public service amongst its members; but, in any case, it has no power to direct or control them, and its functions, usually, are to advise and suggest rather than take independent action.

As stated by Mr. Olivier 'for general purposes of business it is unquestionable that when a Colony has a Colonial Secretary whom the Board of Agriculture can regard as a sufficiently competent Chairman, it is a distinct advantage to have him in that post.' Mr. Olivier, himself, is Chairman of the Agricultural Board of Jamaica and Mr. A. A. Ashmore, the Government Secretary, is Chairman of the Agricultural Board of British Guiana. At Jamaica the Board includes, in addition to the official, scientific and technical officers,

able representatives of the sugar and other industries and members of the mercantile community. The Secretary is the Agricultural Lecturer connected with the Imperial Department of Agriculture. Mr. Olivier adds : 'On the whole the Board is a very strong and active body and has thoroughly justified its existence . . . . . since it has been organized the island has made a great deal more progress in agricultural education than in any like period in the past.' At British Guiana Professor Harrison is Deputy-Chairman of the Board with the Immigration Agent-General, the Inspector of Schools, the Inspector of Prisons, the Superintendent of the Botanic Gardens and the Government Veterinary Surgeon as official members. There are several leading planters as unofficial members, as well as the Chairman of the Agricultural and Commercial Society. The main work is proposed to be accomplished by circulating papers and ripening matters for settlement before being brought up at the general meeting. There are nine sub-committees dealing with Sugar-cane Experiments, Agricultural Education, Experimental Stations, Agricultural Exhibitions, Stock, etc. So far, the work undertaken by the Board at British Guiana has been eminently useful and practical.

It may be added that the Boards of Agriculture in Jamaica and British Guiana are heartily co-operating in the work of the Imperial Department of Agriculture. The Commissioner of Agriculture is *ex officio* member, with a seat at the Board, during his visits to the Colony. Whether, as Mr. Olivier anticipates, Boards of Agriculture would prove of considerable advantage in other Colonies is impossible to determine off-hand. There can, however, be no doubt that there is required, all over the West Indies, wider organization, greater concentration of effort and a more intimate knowledge of the difficulties and circumstances of those engaged in agricultural pursuits. The various Agricultural Societies have done, and are still capable of doing good work; but in many cases they are cramped by want of funds, and in these days of universal depression there are few men that can spare the time and energy necessary to carry them on effectively. A Board of Agriculture, provided it is well organized and supplied with funds, might prove of great service at the present juncture; and the question whether one should, or should not, be formed in any particular Colony deserves the serious attention of the Government and Legislature.

THE SUGAR INDUSTRY IN THE LEEWARD ISLANDS.

The following extract is taken from the address by Sir Henry Jackson, K.C.M.G., to the Legislative Council of the Leeward Islands, on March 13 last :—

"The convention for the abolition of the bounties, so long desired and so arduously striven for, has been signed with effect from September, 1903, but it has yet to be ratified by the different Governments which sent delegates to the Conference. . . . . .

The abolition of the bounties is, however, but the first step towards a renewal of stability in the sugar industry of these islands, since it does but remove the bar which kept cane and bounty fed beet sugars from competing in the same market, and an industry conducted on the unprogressive lines, which have hitherto been unfortunately unavoidable in these islands, cannot hope to survive in open competition.

The beet industry of the continent has been over stimulated by years of liberal bounties, and vast capital has been invested in it by men of energy and intelligence, who will strain every nerve to retain their command of the market. They have been able to afford costly experiments to secure the richest varieties of beet, and to pay high premiums for the invention of machinery designed to yield the greatest return at the cheapest rate from the raw product.

Happily the sugar growers in these islands have not been idle, as, though the means as yet at their command have not allowed of the necessary improvements to machinery, they have not failed by continued experiments to endeavour to secure the best varieties of cane. Those experiments must continue until the desired result be obtained, and every advantage must be taken of the advice and assistance afforded by the Imperial Department of Agriculture, so generously supported in these islands by His Majesty's Government, and whose value is being daily more appreciated.

The provision of the newest and most economical appliances for extracting the juice is not at the moment within our reach, but it seems reasonable to hope that the abolition of the bounties may be an inducement to Capitalists to come forward with the means to provide for the construction of well-equipped Central Factories.

SUGAR-CANE EXPERIMENTS AT ST. KITTS.

The following brief report has been contributed by Mr. Francis Watts dated April 21, 1902 :—

During my recent visit to St. Kitts, where I remained five weeks, the work of reaping the sugar-canes under experiment was practically completed. This involved the reaping and analysis of the canes from between 400 and 500 plots. The Easter season occurred during these five weeks so there was some lost time and consequently high pressure during the working period. One series, namely, the ratoon manurial experiments at Buckley's, could not be reaped during my stay. These canes will be reaped and the results calculated on the basis of the weight of cane per acre, instead of on the sugar in the juice as determined by analysis.

Little or nothing can be said concerning this work until the results are tabulated, though attempts were made, with some success, to calculate the results obtained from the variety plots in different parts of the island, and to inform the planters of the chief points of interest to serve as guides in any operations now proceeding, and thus avoid their waiting for a long time for the information; of course this information is of a purely provisional character and not to the prejudice of the regular report.

It is gratifying to be able to say that very great interest is taken by the planters in the experiments, particularly those with varieties, and I must add that every one gave us most ready assistance in carrying out our work. As soon as we can get the report finished—we are pushing forward the preparation as rapidly as possible,—I propose to return to St. Kitts for a day or two to meet the planters and go through the report with them at a meeting to be called for the purpose. This may lead to interchange of views from which we may all benefit.

DOMINICA.

Cacao Drier at the Botanic Station.

A good deal of consideration has lately been given by the Imperial Department of Agriculture to the question of drying cacao by means of artificial heat. At Trinidad and Grenada cacao driers of various kinds are in use to a limited extent; but, so far, a really efficient cacao drier, at a moderate cost, is still a desideratum in these Colonies. At Dominica no attempt appears to have been made to experiment on a large scale with cacao driers, and during the wet seasons that sometimes prevail in that island considerable difficulty had been experienced in curing the produce by the ordinary method of sun-drying. With the object of assisting planters in obtaining an inexpensive and reliable machine, a cacao drier somewhat on the principle of those tried in Ceylon was erected by the Department at the Botanic Station in 1901. (*West Indian Bulletin*, Vol. II, pp. 171-174 with figure). Mr. George Whitfield Smith, the Travelling Superintendent of the Imperial Department of Agriculture, who experimented with cacao driers in Grenada many years ago, visited Dominica for the purpose of advising in the erection of this drier. By the aid of the accompanying diagram (Fig. 4) the Dominica drier may be briefly explained. In the first place, it should be mentioned that the drying box as shown in the diagram, for protection against the weather, is placed under a shed 32 ft. long, by 18 ft. wide, by 10 ft. high, to the eaves of the building. Portions of this shed are closed on the weather side but open on the others. The box itself consists of a frame of pitch-pine scantling (2 in. by 3 in.) covered with grooved and tongued white-pine boards, the whole resting on mason-work pillars 3 feet 6 inches in height. The measurements of the drying box as shown in the wood-cut are—length 20 feet, width 8 feet, height 4 feet 8 inches. The heating apparatus is placed outside at one end of the box, and consists of a large ordinary stove fitted with a cowl, or hood, which discharges the hot air into the drying chamber through an opening at its lower end. At the further end, near the top, is a circular opening in which is fitted an exhaust fan. This fan is worked by hand and draws the hot air through the drying chamber. The interior of the drying box is divided into three compartments, one above the other, viz: 'A,' 'B' and 'C,' as shown in the wood-cut. The divisions between these (indicated by continuous lines) are so arranged that the hot air is compelled to pass, on the flue system, successively through the compartments in the direction indicated by the arrows. On rising from the stove the hot air first enters compartment 'A' where it passes over and under the cacao beans which are spread on trays made of stout galvanized wire with a quarter-inch mesh, indicated by dotted lines; thence the hot air passes in turn through compartments 'B' and 'C,' through the openings 'E' and 'F' and, finally, is drawn out at 'G' by the exhaust action of the fan. The wire trays are fixed on wheels running on rails, which permit them to be drawn out from time to time for the purpose of stirring or removing the cacao.

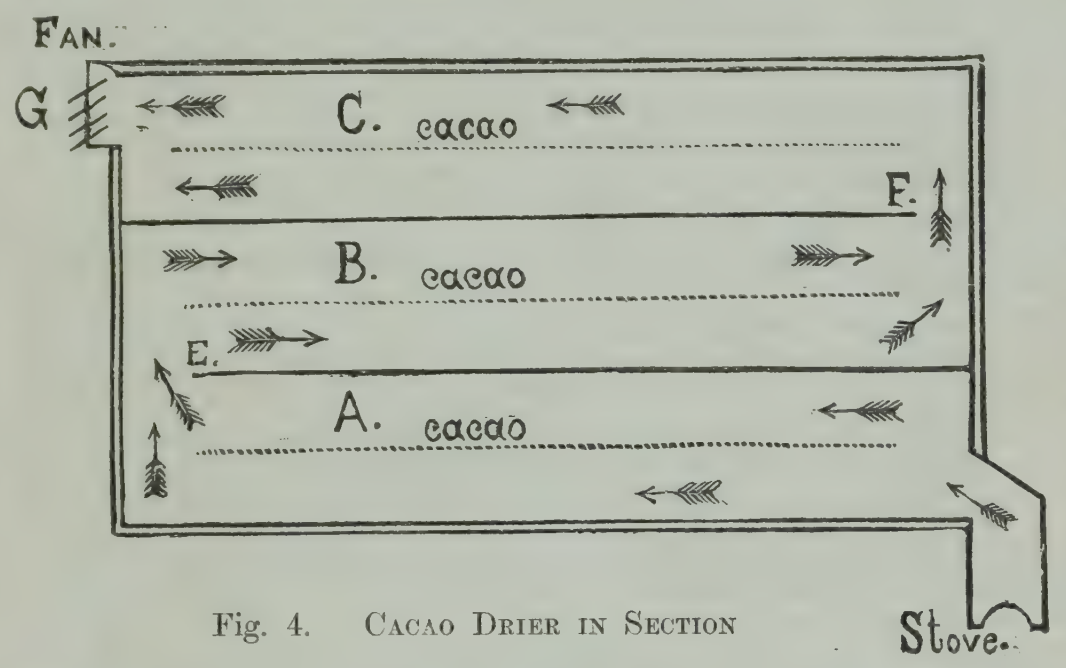

Fig. 4. Cacao Drier in Section

The essential feature of this drier, suggested by Dr. Morris, is the arrangement by which the hot air, on entering the drying box, is conducted along an air-tight flue or channel, and *is compelled to pass over and around the trays in succession,* beginning with the lowest. In this respect it is a great improvement on driers of a similar pattern used in Grenada and elsewhere, which have no interior divisions. In such driers it is found that the hot air on entering the single drying chamber naturally rises at once to the top, with the result that the beans on the upper tray were too quickly dried, while those on the lower tiers were only partially dried, or, in some cases, remained moist.

During the last six months several trials have been made with the drier at Dominica, and, according to the Curator (Mr. Joseph Jones), in each case with satisfactory results. The Administrator of Dominica (his Honour H. Hesketh Bell) confirms this and states that the cacao-drying house will prove a very valuable object lesson. Cacao beans fresh from the sweating box, after being rubbed or washed, were thoroughly dried in thirty-two hours. It was also found that, provided a constant current of air was maintained in the drying chambers by means of the fan, a better sample of cacao was turned out with a comparatively low temperature (140° F.) than when a very high temperature was used.

The drier above described is capable of dealing with five bags of cacao at a time, and its original cost, including shed, stove and fan, was £127. Where, however, the planter is able to utilize a spare building in which to place the drying box and stove, the cost might be reduced by about one half.

For the information of those desirous of erecting a similar drier, it may be mentioned that the fan (18 inches) with belt and driving wheel might be obtained from the Blackman Ventilating Company, Limited, Head Office, 63 Fore Street, London, E.C., at a cost of £9. 6. 0., and the stove (Motts' Comet No. 28) from the I. L. Mott Iron Works, New York and Chicago, at a cost of £10. 17. 3. The latter is surrounded by a galvanized iron jacket to confine the hot air and to discharge it through the cowl into the drying box. The fuel may be wood, coke or coal, as found most convenient. Stout galvanized wire netting, suitable for the cacao trays, is imported by Messrs. Marrast & Co. of St. George's, Grenada, costing about 4*s*. 6*d*. per yard. Those desirous of inspecting the cacao drier at the Botanic Station at Dominica could do so on application to the Curator.

THE ONION INDUSTRY OF CUBA.

Recently the Hon'ble Francis Watts drew the attention of the Department to the increasing quantities of onions that are being shipped from Cuba to the United States of America. As this was likely to have an important bearing on the development of the onion industry, now being carried on at Antigua and other parts of the West Indies, it was suggested that it would be useful to obtain as full information as possible respecting the Cuban industry.

In reply to application made to Sir Percy Sanderson, K.C.M.G., H.B.M. Consul General at New York; and to Messrs. Gillespie Bros: & Co., the following information has been kindly communicated for the use of this Department:—

Sir Percy Sanderson, K.C.M.G.—to the Imperial Commissioner of Agriculture.

British Consulate-General,
New York, March 26, 1902.

Dear Sir,

I beg to acknowledge the receipt of your letter of the 10th instant and enclose a memorandum of such information as I have been able to obtain respecting onions from Cuba. To this I would add that there seems to be every probability that legislation will be passed making a reduction in the tariff of at least 20 per cent. as between Cuba and the United States for a period of two years or perhaps more.

Mr. Carden, our Consul General at Havana will probably be able to give you more detailed information, but I am always glad to give any assistance I can, and I hope you will not hesitate to call on me at any time when I can be of use.

I am, etc.,

(Sgd.) PERCY SANDERSON.

[ENCLOSURE.]

IMPORTATION OF ONIONS FROM CUBA.

The onions from Cuba are considered by the importers to be quite equal in every respect to those imported from Bermuda. The soil is very rich, and American experts are now engaged in cultivation and packing in crates, the latter enabling not only onions but pine-apples to reach this market in good condition. Each crate contains one bushel of onions, average weight 60 lb.: the market price is quoted at $2.50 per crate. A quantity sold at auction on the 24th brought $2.10 and $2.20 per crate.

The import duty is 40c. per bushel of 60lb. The crop reaches here in time to take the cream of the market and is sold before the crop from Bermuda arrives.

The onions are produced from seed imported from Teneriffe and sometimes a second crop is raised from settings.

The importers believe that fruit and vegetables now being grown in Cuba will materially affect the markets of Bermuda and the Bahamas and, to some extent, those of Florida and fruit growing generally in the South. In the latter case this will be especially apparent in the event of the annexation of Cuba.

It is stated by the importers that the soil in the Bahamas is becoming exhausted and that recommendations to improve it have as a rule been ignored.

March 1902.

Messrs. Gillespie Bros. & Co.—to the Imperial Commissioner of Agriculture.

No. 4, Stone Street,
New York, April 4, 1902.

Dear Sir,

We have the honour to acknowledge the receipt of your letter No. 841 dated the 10th March last with the advised enclosure.

In reply from a prominent importer we learn that the Havana onion is grown from seed produced in the Canary Islands: that seed is regularly imported into Cuba from Teneriffe.

Onions from Bermuda are preferred here, and during their season, from May on, sell readily. Havana onions sell best during the winter, December to April, and during the current crop have been received in large quantities. Large onions are disliked by dealers because they may not be retailed as advantageously as those of medium size, which are preferred by consumers. At the moment the market is heavily stocked, and prices range at from $1.50 to $2.00 the crate: the dimensions of a Havana crate (outside) are 7 by 16 by 23; ends solid; top, sides and bottom consisting of slats: the same crate was found to weigh 57 lb. gross. We understand each Havana crate is reputed to contain 1 bushel of onions. The duty on imported onions is at the rate of 40c. the bushel of 57 lb. At present there is no preferential rate in favour of Cuban onions, though we may reasonably suppose some allowance is being sought for this vegetable in the Bills now being discussed by the United States Congress.

It seems to us, success in the American markets with West Indian produce of a perishable nature is largely dependent upon the carrying service obtainable. In this connexion we bring to your notice the following facts. The steamers plying between Bermuda and New York complete the trip one way within 48 hours; and those between Havana and this, perform the service within from 60 to 72 hours. So far the rail and water route has not been used for freight, to our knowledge.

We hope to supplement the foregoing by information which we have requested and hope to receive from Cuba shortly, and trust what we have written will prove serviceable.

(Sgd.) GILLESPIE BROS. & CO.

Stock Farm at the Agricultural School, Dominica.

The pony stallion 'Norman,' belonging to the Imperial Department of Agriculture arrived in Dominica, from the Virgin Islands, last week. He is a fine animal of his class, and doubtless his services will be as fully utilized as in the case of the cob stallion 'Jamaica Lad,' who is now standing his second season in Dominica.

The small stock farm in connexion with the Imperial Department of Agriculture at Dominica now comprises the stallions 'Jamaica Lad' and 'Norman,' the donkey stallion 'Yankee Boy,' two Poland China boars, and two sows, a Shropshire ram, and half a dozen kinds of the best breeds of poultry.

The services of the stud animals are much in request by breeders of stock. Young pure bred pigs are readily sold. The demand for eggs for hatching cannot be fully met with the present pens of fowls.

CENTRAL AMERICAN RUBBER AS A SHADE FOR CACAO.

The question of using the Central American Rubber tree *(Castilloa elastica)* as a shade for cacao, was discussed at the Agricultural Conference of 1901, (*West Indian Bulletin*, Vol. II, pp. 111-113). Dr. Morris in 1883 recommended that the tree might be tried for this purpose in British Honduras. About two years later the suggestion was put to the test of an experiment with the result that in November 1900, the Curator of the Botanic Station, Belize, wrote: 'At Kendal on the Settee River the cacao plantations are thriving well. . . . *Castilloa* is planted for shade; these were, also, in good condition. . . . . There is not a better tree for the purpose.' A second experiment was made in Tobago concerning which, Captain M. Short writes on August 28, 1900, (*West Indian Bulletin*, Vol. II, p. 111), 'I find that cacao bears very well under the shade of *Castilloa*. Nine years ago I planted an acre of rubber and cacao together—the rubber at 24 feet apart, and the cacao 12 feet, and so far as I have noticed there is very little, if any difference between the bearing of these cacao trees and those under the shade of the *Bois Immortelle*. On finding this I planted last year fifteen acres in the same manner and there is every reason to expect that in another eight or nine years they will give a gross return of about £30 per acre? On April 22, of this year, the Curator of the Botanic Station, Tobago, writes: 'The cultivation of rubber in this island ranks second to cacao. On some estates, especially Richmond, probably there are some of the finest trees in the West Indies. A good quality of rubber obtained from these trees realized a high price in the English Market Several estates are planting rubber as shade trees for cacao and they appear to thrive as well as any other shade tree. Coffee also bears well under *Castilloa*.' The question is also touched upon in the Report of the Curator of the Botanic Station, Dominica for 1900. After remarking on the use of the Central American Rubber tree as a shade for cacao in Tobago, he continues. 'That it may be cultivated side by side with cacao may be seen at this Station, where cacao trees, within a few feet of it and under its shade, continue in health and bear good crops.'

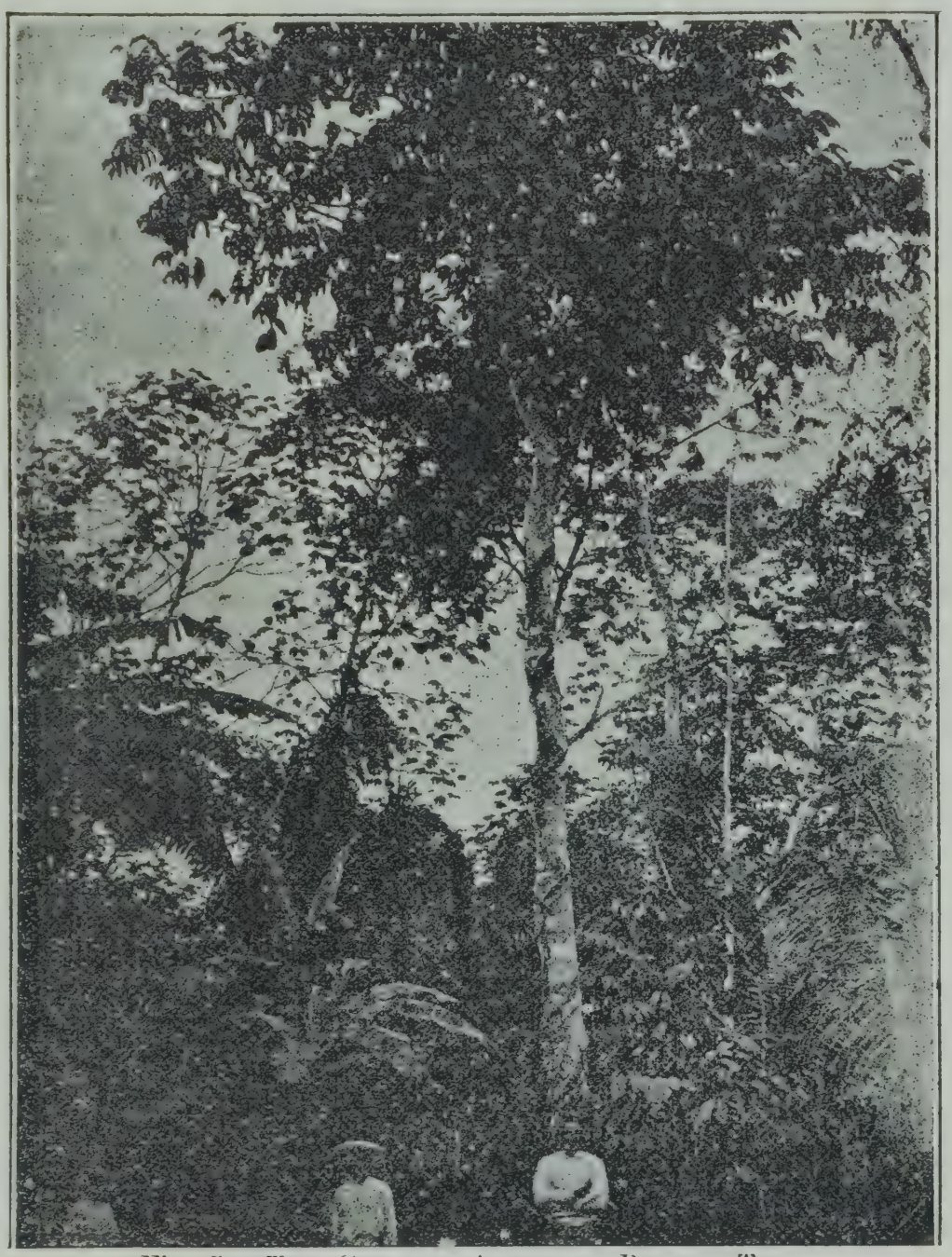

Fig. 5. THE CENTRAL AMERICAN RUBBER TREE.

A tree about 10 years old, growing in British Honduras from a photograph taken by Mr. E. D. M. Hooper of the Indian Forest Department. The spiral cuts on the stem indicate the manner in which the trees are tapped.

Planters in other parts of the world have not been behindhand, At the Agricultural congress held in Java in September 1901, Mr. McGillivray recounted his experience of planting cacao under *Castilloa* (*Der Tropenpflanzer*, March 1902, p. 146). He appears to have planted the cacao between the *Castilloa* when the latter were three years old, as he states 'that in a *Castilloa* plantation of 10 year-old trees, the seven year old cacao planted between, as well as the *Castilloa* looked well? He recommends planting the *Castilloa* at intervals of 36 feet.

It does not necessarily follow from these isolated instances that *Castilloa* is to be recommended as a universal shade for cacao. As is so commonly the case, a method excellently adapted for one locality may be quite unsuited to another. We can say however that Central American Rubber has been used with success as a shade tree for cacao in British Honduras, and Tobago, and, so far as the published results show, with satisfactory results in Java also.

The illustration is reproduced from the Cantor Lectures on 'Plants yielding Commercial India Rubber' delivered before the Society of Arts, by Dr. Morris, April 1898.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the Imperial Commissioner of Agriculture, Head Office: Barbados. It is particularly desired that no letters be addressed to any member of the staff by name. Such a course will entail delay in dealing with them.

Communications should always be written on one side only of the paper. It should be understood that no contributions or specimens will, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Local Agents and not to the Head Office. Where no Agents exist subscriptions at the rate of 3*s*. 3*d* per annum, payable beforehand, will be received at the Head Office.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News.

Vol. I. SATURDAY, MAY 10, 1902. No. 2.

NOTES AND COMMENTS.

Agricultural Shows.

The next local Agricultural Exhibition at Barbabos will probably be held at Todds Plantation in St. John's. These Exhibitions are held in a different parish each year and are becoming increasingly popular. Special prizes are offered for plants and produce grown in school plots. At Montserrat it is proposed to organize an Agricultural Show in connection with the Coronation festivities in June next.

Treating Cane Plants with Tar.

Referring to the experiments described in the *West Indian Bulletin* Vol. III. p. 73, for treating cane plants with tar to protect them from insect and fungoid pests, Mr. J. T. Thorne writes:—

'This reminds me that in the early forties the cane crops in Barbados were destroyed in the red soils by "blight" and that my uncle J. T. Skinner, who was attorney and manager of Black Bess estate for a long period, was the first to succeed in establishing a crop by soaking the plants in a mixture of Barbados green tar and water. I have not heard whether the green tar has been tried in later years.

Sugar-cane Crop in Europe.

It is not generally known that the sugar-cane is still cultivated in Europe ,especially in Southern Spain. According to a recent Consular Report:—

Sugar-cane is grown all along the Coast of Malaga and the annual yield of sugar is about 30,000 tons. There are seventeen sugar factories in the provinces of Malaga and Granada, employing many thousand hands. Grinding generally begins about the middle of March. This year, it may commence earlier.

Production of Beet Sugar.

The total production of beet sugar in the United States in the season 1901-2 has aggregated 185,000 tons, an increase of 140 per cent. from the 77,000 tons produced during the season 1900. There were thirty-one factories in operation in 1900 according to census figures and eleven more were started in 1901.

A New By-product of Sugar.

Attention has been called to the preparation of 'molascuit,' a new cattle food suggested to be prepared in the West Indies from molasses and 'cush cush,' the finer parts of the fibre of the sugar-cane. The proportions of the composition are 80 to 85 per cent. of molasses and 15 to 20 per cent, of 'cush cush.' It is claimed that when air-dried, and ready for market, it presents the appearance of very finely ground oil-cake, and to the taste it is sweet and agreeable. It is probable that in this form molasses, when prices are low, may be capable of being utilized to a large extent and provide a valuable food for stock.

New Varieties of Bananas.

For some years efforts have been made by the Royal Gardens at Kew to obtain all the best varieties of bananas found in the far East, for the purpose of introducing them into cultivation in the West Indies. A collection comprising twenty-three varieties was received by the Imperial Department of Agriculture in 1898 and grown at Dominica and St. Vincent. Suckers from these have since been distributed to Jamaica, St. Lucia and Grenada. By a recent mail a second collection of bananas (in this instance obtained from the Straits Settlements) has been received from Kew.

Peppers or Chili Peppers.

Among the recent publications of the United States Department of Agriculture is a Bulletin entitled *A list of American varieties of Peppers*, by Mr. W. W. Tracy, Junr., in which an attempt is made to remedy the confusion caused by the perplexing multitude of names used by different seedsmen. The standard name of each variety is given, and the name of the seedsmen who catalogue that variety. The more important synonyms are added. This pamphlet is the first instalment, as an experiment, of a work, already in MS., which attempts to standardize all the principal varieties of vegetables sold by seedsmen in the United States.

Planting Orange Trees.

In Jamaica great stress is laid on the fact that orange trees should not be planted too deeply. It is recommended that when transplanting orange plants from the nursery to the field, preferably after good showers, holes should be dug two feet square and nine to twelve inches deep. The hole is to be filled with surface soil mixed with wood ashes, pressed firmly until

it is level with the surface of ground. The orange plant is then placed on this with the tap root firmly fixed into ground. 'The neck of the tree should stand well above the surface of the soil on a circular plot of good earth, soft but firm. *It is absolutely fatal to plant orange trees too deeply.*'

Cotton Production in the West Indies.

During the last thirty years cotton cultivation has been almost abandoned in these islands. The only locality where it it has survived is the small island of Carriacou connected with the Colony of Grenada. It is noticed that Carriacou cotton was recently quoted in the London market at $4\frac{7}{8}$c. per pound. Experiments in growing cotton are being carried on at St. Lucia, Montserrat and Antigua. It would be of distinct advantage if a cotton industry could be established in some parts of the West Indies. In addition to the cotton itself, cotton seed, converted into meal, is valuable for feeding purposes; or, if the oil were extracted, the residual cake is good for feeding and for manurial purposes.

Journal, Jamaica Agricultural Society.

This Journal, now in its sixth year of issue, is recognized as one of the most useful agricultural publications in the West Indies. It was started by Mr. George Douet, the late Secretary, with the object of affording hints and suggestions specially adapted to the requirements of small cultivators. The Society is to be commended for continuing to publish the Journal on the original lines; and there can be no doubt that it is a valuable agent in disseminating information and in encouraging sound agricultural methods in the island. A similar Journal dealing with local conditions, and in full sympathy with the difficulties of cultivators, large and small, would be of great service elsewhere in the West Indies.

Agricultural Development in the Bahamas.

In the speech of the Governor of the Bahamas (Sir Gilbert Carter, K.C.M.G.) at the opening of the Session of the Legislature on February 19 last, his Excellency laid stress on the wisdom of paying more attention to the careful and systematic cultivation of the land. He added:—

No doubt the soil of these islands is mainly of an intractable character, but I am quite sure that capital judiciously expended upon it would not be wasted. There is an important distinction between the culture of plants and their mere growth; no doubt in some directions, special attention is devoted to the pine-apple, but as a general rule anything approaching to the scientific culture of economic products of the soil is exceptional in these islands. I still hold the opinion, which I expressed on my first arrival in the Colony, that it would be a manifest advantage to join in the Botanic Garden [agricultural] system of the West Indies under the able direction of Dr. Morris, and I trust that the Legislature will sooner or later make provision for such a scheme.

Volcanic Ash in Barbados.

A description of the volcanic eruptions at Martinique and St. Vincent has already been given in the newspapers. It may be worthy of note that the volcanic ash that fell at Barbados from 5 p.m. on the 7th. to 4.30 a.m. on the 8th. varied from three-eighths to half-an-inch in depth. It covered houses, trees, and all vegetation with a grey mantle of impalpable powder and gave the landscape a singular appearance. By actual measurement it has been ascertained that the weight of ash was at the rate of 17·58 tons per acre, or 11,251 tons per square mile. Taking the area of Barbados as 166 square miles it is probable that nearly two million tons of ash were deposited over this island alone. An immense quantity must have, also, fallen into the sea. The composition of the ash has not yet been ascertained. It is probable, as in the case of the 'May dust' of 1812, that it contains silica, alumina, oxide of iron and oxide of manganese with some trace of sulphur. It should be regarded in its ultimate results, at least, as beneficial to the soil.

'Minor Products' in Ceylon.

The following extract from the address of the Governor of Ceylon to the Legislative Council of the Colony on October 18, 1901, summarizes briefly some of the recent efforts made to supplement the staple tea industry of the island by the cultivation of other products:—

Cacao is doing well, and on most large estates the canker has been largely eradicated. Cocoa-nuts, cinnamon, cardamoms, and other smaller products have been in a prosperous condition during the year.

Of new products, rubber claims the first place. Exports of appreciable quantities have commenced, and the prices obtained have been most satisfactory. The latest market report contains the entry 'Best Para, 3*s.* 9*d.*; Ceylon, fine, Para sort, 4*s.* $1\frac{3}{4}$*d.* per lb.' This cultivation may now be considered established in the wet low-country districts.

Camphor has continued to attract attention, and bids fair to prove a paying minor product for many parts of the south-west and the hills. Samples prepared from trees grown in the Botanic Gardens have lately been valued at 126*s.* per cwt. The yield of camphor from clippings of leaves and young twigs is about 1·2 per cent. and the preparation is cheap, so that in places where 16,000 lbs. of clippings can be obtained from an acre in a year, there is little doubt that it will pay well.

Of other minor or new products, tobacco continues to extend, also vanilla, pepper, cinchona, and cassava: the roots of the last named are, however, only used as yams, and not for the preparation of tapioca. Citronella oil is in a very depressed state, owing to over-production and to low prices, with new competition in unadulterated oil from Java. The adulteration of our oils is so wholesale and so shameless that it is difficult to foresee any remedy for the depression, unless the cultivation be taken up by large manufacturers. A detailed investigation has been made, and a report will soon be published.

Investigations are being made into the Ceylon gutta-perchas, ebonies, and other subjects. *(Board of Trade Journal*, Jan. 16, 1902.) . . . . .'

WEST INDIAN FISHERIES.

The Artificial Propagation of Sea-eggs.

Dr. Caswell Grave, Ph. D., Assistant in Zoology in the Johns Hopkin's University, has forwarded to the Department the following paper:—

The present depleted condition of the sea-egg grounds of Barbados are set forth in a report of the sea-egg industry, published in the *West Indian Bulletin*, the Quarterly Journal of the Imperial Department of Agriculture for the West Indies.

After carefully reading the report and discussing the question of a practical remedy for these conditions with Dr. J. E. Duerden, the writer of the report, I have decided that it may be worth while to call the attention of those interested in the artificial re-stocking of the sea-egg grounds of Barbados to some results which I have recently made in the rearing of sea-urchin larvæ which, both in structure and habits, are very similar to the larvæ of the Barbados edible species of sea-urchin, *Hipponöe esculenta.*

The method by which I have been able to rear sea-urchin larvæ in great numbers is based upon principles which are purely biological, and since the method has been successful when applied in the laboratory on a small scale, in which the difficulties to be overcome are much greater than under conditions in which the experiment could be carried out on an extensive scale, I think there is little doubt but that it could easily be made to yield practical results to such an extent as to have a commercial value.

The simplicity of the method and the small expense with which it could be put into operation are features which are not unimportant when considering its applicability to the case under consideration. When once instituted the work of carrying out the method would resolve itself into a routine which could readily be taken up by any intelligent labourer.

The students of morphology have made many attempts to rear the larvæ of Echinoderms in laboratories, for in making a comprehensive study of the structures of the adult sea-urchin, it is necessary to follow each structure from its first beginning in the larvæ to its final condition in the adult. To do this, full series of larvæ are needed covering all the various stages passed through by the eggs in their growth into the adult form.

Very few of these attempts to rear Echinoderms in sea-side laboratories have succeeded in producing even a single animal having the adult form, because the methods which have usually been employed have failed to reproduce the natural conditions under which the larvæ feed and develop in the open sea.

During the summer of 1900 while working in the United States Fish Commission Laboratory at Beaufort, N. C., I accidentally discovered a method which I have since used with very gratifying success. Late in the summer of 1900 I reared a 'brood' of thousands of sea-urchins *from the egg to the adult form.* In 1901 *two* such 'broods' were carried through and also a 'brood' of a species of *Ophiurid.* In addition to this, the little sea-urchins together with some just metamorphosed spatangoids were taken from the sea-shore to the Zoological Laboratory of the Johns Hopkins University where they lived and grew normally and rapidly for more than two months in an aquarium which had but about one liter of sea water. During this time the water of the aquarium was changed but twice.

The conditions in this aquarium, so far as the little Echinoderms were concerned, were approximately those of the sea and, as in the sea, the supply of oxygen and food were self-perpetuating.

It is very probable that the food of the larvæ of the Barbados sea-urchin consists of the same or similar microscopic plants which make up the food supply of the larvæ of the Beaufort species. It is also probable that these microscopic plants can be easily collected and made to live and multiply with the larvæ of the sea-urchins.

If this can be done, then the important questions of food and oxygen for the larvæ which it is desired to rear are solved, and when such cultures are started, and when the fully developed larvæ can be liberated over the sea-egg grounds in great numbers, in the stage which immediately precedes that in which they settle to the bottom, then the re-stocking of the sea-egg grounds will have begun; for before the tide can have carried the larvæ out to sea many of them will have taken up their life upon the bottom, and in a short time there is every reason to expect they will grow to a marketable size.

Baltimore, March 7, 1902.

The Tarpon.

The following information on the habits of the tarpon, known in British Guiana as the 'Kuffum,' is taken from a paper by 'Oxon' on some notes on Fly Fishing in British Guiana (*Timehri*, Vol X. pp. 305-6, December 1896). It forms an interesting addition to the notes contributed by the Hon'ble L. J. Bertram and reproduced on page 8 of this Journal:—

The finest fish in the colony for sporting purposes is the cuffum, a large fish of the herring family. My old friend B. J. Godfrey always asserted that it is the same fish as the tarpon which affords such splendid sport in the lagoons of Florida and I believe he was right. It is a handsome fish, silvery like a salmon, with large scales, and the gamest fish I ever hooked. He has been caught in our rivers and creeks up to twenty pounds in weight, and when hooked he makes some determined rushes; when he finds that he cannot free himself, he makes tremendous leaps into the air, coming down with a splash that makes you tremble for your tackle. The cuffum has a bony palate and the sides of his mouth are like parchment, so that it is very difficult to hook him securely; a dozen fish may be touched for one that is landed. He is generally caught with a red and white mackerel or gaudy salmon fly; but the largest fish are caught with live bait, fishing as you would for pike. As I have said, I have never seen cuffum, caught with a rod, more than twenty pounds in weight; but I once saw a fish 5 ft. in length which was caught in a net off the mouth of the Mahaica Creek.

Pond flies. Amongst the day-flying insects, few are more noticeable than the pond flies or dragon-flies. All day hawking in the air with occasional rests on a twig or grass stalk, these voracious insects exercise no small function in Nature's economy. Their food consists of the smaller insects of which they are so many always on the wing, and the destruction the pond flies are responsible for must be truly enormous. Pond flies are the perfect form of the 'water-tiger,'

those formidable grub like insects found in ponds and streams. The grub is no whit less formidable than the dragon-fly, feeding voraciously on all the living creatures it can catch in the water, till it arrives at maturity and leaves the water to complete its life in the air.

AGRICULTURAL EFFORTS AT ST. LUCIA.

The following notes have been contributed by Mr. George S. Hudson, Agricultural Instructor. The notes under 'cacao' and 'ground provisions' are intended to apply to operations during the month of May :—

COTTON INDUSTRY.

The cotton ginning machinery imported jointly by the St. Lucia Agricultural Society and the Imperial Department of Agriculture is now working three days per week, and the small proprietors have immediately recognized the value of its institution. The machine is a Dobson and Barlow double action Macarthy gin, driven by horse gear, and turns out about 40 lb. of clean lint per hour. Ninety per cent. of the seed, only, is retained by the ginner to cover cost of ginning. Prizes are being annually offered for the best patches of cotton, and experiments are being conducted at Rivière Dorèe Experiment Station to determine the variety of cotton best suited for this district. His Honour Sir Harry Thompson has keenly interested himself in the success of this movement, and by occasional visits to Choiseul has done much to dissipate the habitual distrust of peasant proprietors, when they feel unusual interest is being taken in their welfare. The successful working of the machine has now put the result of the experiment beyond doubt, and there is every prospect that in future cotton will be an established cultivation here.

Cotton should be planted as soon as the soil is moist enough to allow of working: the ground should first be thoroughly forked, if heavy crops are wanted, and then drawn up with a hoe into beds 2½ feet wide and about 6 inches above the furrow, which should be a foot wide. Insert not less than six seeds to a hole in the middle of each bed, and make holes 4 feet apart. The furrows between each bed will act as drains and should empty into cross drains at 50 feet apart to carry the water away. Do not allow more than two or three plants to grow in each hole.

CACAO.

Every effort should be made to get all plantations thoroughly clean before the rains which may be expected towards the end of this month: one weeding in the dry weather is worth two in rainy months. May is the month to plant cuttings of 'immortelles' for shade or boundaries, and other live posts, such as hog plum, for fences; in this month these trees naturally renew their foliage, and consequently they are more likely to grow as cuttings. Immortelle seed are also now obtainable and should be gathered to supplement a limited supply of cuttings. Insufficient shade and shelter is one of the greatest wants in St. Lucia cacao cultivation, and this is the best time to take steps to remedy it. Pruning operations on cacao should be now suspended on all but the unhealthiest and almost barren plantations, as flowers are now appearing freely on all branches. The same remarks would apply to forking, except where manure is being applied to a hard surface, when very light forking would be permissible as soon as the rains come.

GROUND PROVISIONS.

Those having vacant land suitable for plantains, tannias and yams would do well to plant them up in May or June, as there seems every possibility of scarcity and high price of these products a year hence, as the amount of forest land cleared this year has been small. Do not plant maize later than June if you want a successful crop. The present high price of sweet potatos and manioc is likely to induce much planting of these foods with a consequent glut in October and November: it would be better to plant about August.

AGRICULTURAL PROGRESS AT DOMINICA.

The following is taken from the recent address of the Administrator of Dominica to the Legislative Council:—

No reference to the progress of our economic products would be adequate without a cordial recognition of the excellent results that have already been brought about by the assistance of the Imperial Department of Agriculture. Not only can Dominica boast of Botanic Gardens which are among the most beautiful in the West Indies, but the distributing station in Roseau is doing work the value of which can hardly be over estimated. No less than 58,000 seedling trees were distributed locally during 1901. Of these, 36,000 were lime plants and 12,000 were cacao seedlings. Budded orange trees of the best varieties, rubber-yielding trees, pine-apple suckers, and vanilla cuttings have also been largely distributed, and the enormous demand for seedling plants of all kinds is evidence of the extent to which new lands are being brought into cultivation. The advantages to any one embarking in agriculture of being able to procure from the Botanic Station large quantities of carefully selected and well grown seedling trees at a rate considerably under cost of production are plainly apparent, and this island thus offers special inducements to intending settlers.

A model equipment for the artificial drying of cacao has been erected in the Botanic Gardens, and planters now have an opportunity of adapting the process to their own requirements without running the danger of having to buy their experience.

The Agricultural School is also proving itself an institution of great value, and the sound practical instruction which is being imparted there to specially selected sons of peasants cannot but have excellent results in the future. A small stock-farm has been established in connexion with the school, and breeding-animals specially suited to this island have been imported.

Scale-Insects on young plants. At the Dominica Botanic Station large numbers of citrus plants are raised from seed and the young plants are liable to scale insect attack. Mr. Jones, the Curator, hit on the method of painting a ring of whale-oil soap round the base of the stem of each plant. Should scale-insects occur among the young plants and be overlooked, they would be unable to spread, as the ring of soap would prevent the young insects crawling up the stems of neighbouring plants. A similar method has been used on bearing lime trees at Dominica. It was found that the orange snow-scale spread up the back of the stem from the base, and to check this, a ring of tar was painted on each tree near the base. The spread of the scale from tree to tree is stopped, the tar forming a barrier to the young insects.

The Cacao flower. Cacao pods are developed from minute flowers which are borne on the main stem and branches of the cacao tree. Before however a flower can give rise to a pod, it must first be fertilized or set. The manner in which the pollen is transferred from the anther to the stigma of the cacao flower does not seem to have been thoroughly worked out in the West Indies. Perhaps someone who has the opportunity and time for this study will investigate the subject. The knowledge thus gained might be of practical value to cacao planters as a whole, at any rate it would be of interest.

BEE KEEPING.

Jamaica.

The following extract is taken from the Report of the Collector General of Jamaica for the year 1900-1901:—

The improvement in the exports of honey bears witness to the combined intelligence and patience which are being brought to bear on the production of the minor products, and indicates the possible attainment of a high standard of excellence in all branches of agricultural enterprise within the near future. Bee-keepers have adopted centrifugal apparatus for expelling the honey from the comb, and the comb itself, instead of being melted down as heretofore is returned uninjured to the hive, thus considerably increasing the output of the more valuable product, honey, whilst reducing that of wax.

POULTRY.

Camphor is an infallible remedy for chicken lice. When you make your nest and put in your eggs, at the same time place in the nest with the eggs, one camphorated ball, which is sufficient for the entire incubation, and your hen and little chicks will leave the nest free from all kinds of vermin. When you have placed the little ball in the nest, you need not bother any more. It will evaporate and get to be very small toward the latter part of the incubating, but never mind, it has done its work. It is a good idea to keep one of the balls in the nest where the hens lay, as it keeps them from having scaly legs as well as keeping them free from vermin. The camphorated ball is a little white ball and can be had from almost any drug store. I buy penny squares in Kingston, instead of the ball, and half a one is effective in the layers' nests.—*(Journal of the Jamaica Agricultural Society.)*

GARDEN NOTES.

Vines in the West Indies are very liable to be attacked by a 'rust' causing the leaves to curl up and wither. When this occurs all dead leaves should be gathered and all parts of the vine, and the new leaves, washed over or dusted with flowers of sulphur. Bordeaux mixture may also be sprayed over the vines. For hints as to the preparation of this mixture, see *West Indian Bulletin*, Vol. II, p. 210.

The secret in the cultivation of Gold and Silver Ferns is to water them *over-head* as little as possible. Give water at the roots only.

A correspondent recommends The Good Reese Company, Springfield, Ohio, U.S.A., as a reliable firm from which to obtain roses and other plants. They come 'beautifully packed and are very cheap.'

The Ground Nut. The formation of the underground fruits of the ground or pea-nut (*Arachis hypogea*) is very interesting. After the flowers of this plant 'set,' the yellow petals fall and the flower stalk elongates considerably in such a way as to bury the tip of the stalk, with the remaining portions of the flower in the ground. The fruit then matures and thus, when ripe, is found completely buried in the earth.

SAVING OF SEED CORN.

The following account of the methods to be adopted in selecting corn (maize) for seed is taken from the Yearbook of the United States Department of Agriculture for 1900, p. 759.

The best plan for saving corn for seed is to go through the field before the crop is harvested and gather the best ears from the best stalks. The largest yields of grain are usually made from varieties producing two ears on each stalk, and if such a variety is desired then seed should be saved only from stalks bearing two ears. It is sometimes claimed that the upper one of two ears, will produce the earlier maturing crop, but unless early maturity is of considerable importance, if a stalk has two good ears both should be taken; if one ear is good and the other only fair the better one may be taken; while if either ear is very poor in size, shape, or fulness both should be rejected. If a variety bearing only one ear to each stalk is preferred the ears selected for seed should be the largest which can be found, of nearly equal diameter throughout, and well filled at each end. It is as important to take seed from the best stalks as from the best ears, and whatever variety may be preferred every ear which is selected for seed should be taken from a stalk which in size, habit of growth, and number of ears approaches closely to what is the desired form for that variety.

If careful hands are employed in gathering the crop a very good selection of seed may be made by having a box in the waggon into which the most desirable ears may be thrown as they are found.

In selecting seed from the crib, as is often done, nothing can be known of the character of the stalks upon which the ears were grown, and little or no improvement can be made in a variety by such a selection; while a careful and judicious selection in the field will work a constant and gradual improvement in the crop, and will make it more nearly uniform with each succeeding year. No one item in the growing of corn is of greater importance than the selection of seed.

After the seed has been selected it should be thoroughly dried, treated with bisulphid of carbon to destroy insects, and then stored where it will be kept dry and secure from rats and mice.

It is a somewhat common practice to discard the tips and butts of the ears when shelling the seed for planting, but the practice is of doubtful benefit. A number of the experiment stations in both the North and South have made repeated tests of the productiveness of seed from different parts of the ear, but these tests have shown no marked or constant differences in yield, even when the selections have been repeated through several generations.

For all ordinary purposes the value of a variety depends on the amount of shelled corn which it will produce per acre. This in turn depends fully as much on the growth and productiveness of the individual stalks as upon the size and shape of the separate ears, and for that reason seed should always be selected in the field rather than from the crib.

EDUCATIONAL.

Cambridge Local Examination.

SECTION OF AGRICULTURAL SCIENCE.

It has been announced by the Secretary of the Local Examinations and Lectures Syndicate of the University of Cambridge that for the Senior Local Examination in December 1902, a new section has been added for Agricultural Science, 'specially calculated to meet the need of students in the West Indies.'

The following is a detailed schedule of the requirements in Agricultural Science, and at the request of the Secretary there are added a few suggestions for adapting the schedule more nearly to meet the circumstances of the West Indies :—

CAMBRIDGE LOCAL EXAMINATION.

AGRICULTURAL SCIENCE. (SENIORS).

PAPER I.

Candidates will be expected to show, by their answers, that they have acquired practical knowledge by their own observations and by experiments of the following subjects.

The ultimate composition of plants—carbon, hydrogen, oxygen, nitrogen, phosphorus, sulphur, chlorine, potassium, sodium, calcium, magnesium, iron, silicon. The chemistry of these elements and their simpler compounds, their detection in plants, and in soil. Water and sand cultures.

The structure, arrangement, and functions of leaves. The structure and functions of roots and stems with their chief modifications.

The soil as a source of plant food, its mechanical and chemical composition, and its relations to the supply of water and heat to plants. The absorption of food from the soil: osmosis, capillarity, transpiration.

The structure and functions of the flower and its various parts. Pollination and fertilization. The development, structure, and dispersal of fruits and seeds. The germination of seeds, and the utilization of their reserve stores. Translocation of foodstuffs. Propagation by vegetative methods.

Candidates will be expected to have a general knowledge of the useful and harmful plants in the following natural orders :—Cruciferae, Rosaceae, Leguminosae, Chenopodiaceae, Polygonaceae, Solanaceae, Labiatae, Gramineae *(a)*.

PAPER II.

The formation and properties of soil. The Agricultural characteristics of typical soils. The amelioration and improvement of soil. The properties and uses of important manures. The principles of rotations. The employment and purpose of implements used in cultivation. Farm crops in their relation to soil, manure, cultivation, harvesting, disease, and insect injury *(b)*. Permanent grass-land, its formation and management *(c)*. The characteristics of common farm weeds.

The distribution and characteristic features of the more important breeds of farm stock *(d)*. The feeding of farm animals, and the compounding of typical rations.

The modifications suggested by the Imperial Department of Agriculture are as follows :—

(a). The substitution of the following natural orders for those given above : Gramineae, Palmaceae, Scitamineae, Leguminosae, Solanaceae, Euphorbiaceae, Rutaceae, Malvaceae.

(b). For 'Farm crops' substitute 'West Indian or Tropical crops.' The scope of the latter to be limited, preferably, to Nicholls' *Tropical Agriculture* (Macmillan). Sugar, Cacao, Coffee, Tobacco, Cocoa-nut, Banana, Orange and Lime, Pine-apple, Arrowroot, Sweet Potato.

(c). For 'Permanent Grass-land' substitute 'West Indian Grass cultivation' including the following :—Bahama Grass *(Cynodon Dactylon)*, Guinea Grass *(Panicum maximum)*, Para Grass *(Panicum muticum)*, Sour Grass *(Andropogon pertusus)*.

(d). As in some Colonies little or no attention is devoted to the breeding of farm stock, the following might be offered as an alternative study in such Colonies:—'The Alimentary Canal and its appendages. Comparison of the Alimentary Canal in the Rabbit, Horse, Ruminant and Fowl. Digestion in the mouth, stomach and intestine.'

Educational Efforts in the West Indies.

'The Jamaica Journal of Education' gives an interesting account of the origin and extensive use of Blackie's *Tropical Readers* and other agencies for improving agricultural education in the West Indies :—

It was in 1893 the Jamaica Board of Education suggested the preparation of such books as we are now familiar with under the designation of Blackie's *Tropical Readers*. It was not till early in 1897 that the first of the two came to the island ready for general circulation. Now they are schoolbooks in use throughout the whole of the British West Indies, as we ventured to say to the publishers they would be when the plan only of them was being considered. When they were in the printer's hands Dr. Morris saw them and wrote—'I have had the opportunity of reading the proofs of these interesting little books, and I feel sure they will be of invaluable service in familiarizing the children with the proper mode of cultivating crops suitable to the island, and in preparing them later on to take up the systematic study of agriculture as a science. They will also be read by adults as well as by children.' 'Such books,' he went on to say, 'cannot fail eventually to raise the character of practical agriculture in the island and render the people more capable than at present in responding to the requirements of the markets of the world.' 'The island' referred to by Dr. Morris was of course Jamaica. The Imperial Department of Agriculture for the West Indies was not then in sight. Now, as Commissioner at the head of it, he tells that these Readers are in general use in class work throughout the area to which his Commission extends.

With these Readers in daily use the intelligent teacher finds it comparatively easy to give a new interest to object lessons. He can lead his pupils to go to and come from school with eyes seeking knowledge where none was sought before. The children are in this way made to feel that the school has to do with all the life around them. It can no longer be said that Nature is a foreign country to our school children. This is a great change, and happily it now applies to the whole of the British West Indies. It is at once a part of a great educational movement on lines approved by the foremost educationists, and a laying broad and deep, at the right time, and in the proper place, of the foundations of a true material and social upbuilding of the mass of the West Indian people. This great beginning was felt, here at least, to be needed and was begun before the Royal Commission and Mr. Chamberlain took us in hand. The four Barbados Conferences, Mr. Watts' *Nature Teaching*, Mr. Freeman's *Hints for School Gardens*, the Lectures on Agricultural Science, the *West Indian Bulletin*, the many pamphlets of the Imperial Department of Agriculture, and the labours of the Commissioner, Dr. Morris, are all harmoniously working together for the great end of making the British West Indian estates prosperous, and of placing that prosperity on the solid basis of the intelligence and energy of the people who cultivate them.

DEPARTMENT NEWS.

Professor J. P. d'Albuquerque, Island Professor of Chemistry and Chemist-in-charge of Sugar-cane Experiments, at Barbados, proceeds to England, on vacation leave of absence, in R.M.S. 'La Plata' to-day.

Mr. H. Maxwell-Lefroy, the Entomologist to the Imperial Department of Agriculture, goes home on short leave of absence by mail to-day. In returning to the West Indies Mr. Lefroy will pay a visit to the United States to study appliances and methods for dealing with insect pests.

On the recommendation of the Imperial Commissioner of Agriculture for the West Indies, Mr. Thomas Osment has been selected as Agricultural Instructor at St. Vincent in connection with the Land Settlement Scheme.

Pamphlet (No. 15) to be published to-day, contains the summary of an address entitled 'Plain talk to Small Owners' delivered by his Honour F. H. Watkins, the Commissioner of Montserrat. It contains hints likely to be of service in all parts of the West Indies. The pamphlet is on sale by all Agents of the Department.

The first number of the third volume of the *West Indian Bulletin* has recently been issued. It contains a report of the proceedings of the Agricultural Conference held in January last with the papers and discussions relating to the sugar industry. Also a paper on Agricultural Boards and the report of the Chemical Section. Two important papers on the sugar industry of Jamaica from Mr. Cousins and Mr. Shore deal with the possibilities of Jamaica's sugar industry from the point of view both of the trained chemist and the practical planter. Mr. A. Howard gives the results of experiments to protect cane cuttings from fungoid disease by means of Bordeaux mixture and tar, and Mr. Lefroy follows with an account of the lady-bird borer of the sugar-cane. The *West Indian Bulletin* is regularly on sale by the local Agents of the Department in all parts of the West Indies.

Chitin. Chitin is the scientific name of the substance forming the chief part of the hard integument of insects. It is a peculiar nitrogenous compound, probably variable in composition, which resists the action of alkalies and acids which would dissolve the remainder of the insect's body. When newly formed, as when an insect casts its skin, it is white, but under the action of light it deepens in colour. Insects if kept in the dark after moulting remain white, the chitin deepening in colour only after light acts on it. Chitin is not found in insects only, but occurs in centipedes, millipedes, spiders, etc., as also in some worms, and in the pen of the cuttlefish. Chitin, or some substance very closely resembling it, has also been found in the vegetable kingdom, in certain fungi. Nearly half the weight of the skin of an insect is chitin, and it is certainly the constituent that gives the peculiar hardness, elasticity and flexibility to the outer integument of insects.

SCIENCE NOTES.

A Bird-lime Tree.

There is a very common tree generally distributed in the West Indies known as "Cock-spur" in Jamaica and Bahamas. Another name for it in Jamaica is "Fingrigo." It is the "Black-Thorn" of Barbados and Croc-a-chien (Dog-tooth) of the French Islands.* It has a scrambling habit with black stems and branches plentifully armed with numerous recurved spines. It somewhat suggests the black thorn of Europe, especially, when the fresh green leaves come out in early spring. The Stems when large enough are sometimes used as walking sticks. The male flowers appear as small green buttons in the axil of the thorns. The female flowers, generally on different plants, consist of a loosely diffused panicle of a dull rufous-brown colour.

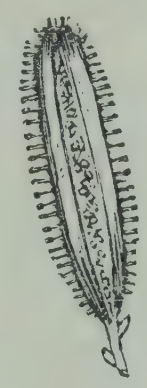

Fig. 6. Fruit of *Pisonia aculeata*. Showing three of the five rows of sticky glands.
(Three times natural size.)

The angles of the fruit (the latter about half an inch or more long) are covered with viscid glands. Barham, a quaint old writer (about 1720) on the plants of the West Indies states that by means of the glutinous glands the fruits of the "Fingrigo" stick fast to anything they touch. He adds "I have seen ground-doves and pea-doves, that covet to eat the seeds, stick so fast about them that they could not make use of their wings so that you might take them up in your hands." It would be interesting to learn whether others have noticed that the glandular fruits of this plant serve as "bird-lime', and attach themselves to birds and other animals.

**Pisonia aculeata*

To Kill an insect. It is sometimes necessary to kill an insect when no killing bottle is handy, without injuring its appearance. This may be done in a variety of ways. A moth or butterfly may be carefully pinched below the insertion of the wings, when it will probably die. Beetles are easily killed by dropping them into hot water: the same applies to many small insects which may be dropped on to the surface of the liquid. Kerosene is deadly to many insects, as also is turpentine and some strong smelling oils, but these should not be used with hairy insects nor with those whose wings are covered with scales. Rum, whisky or any strong spirit can also be used, in which case the insect, unless a soft-bodied one, should be removed from the liquid as soon as it is dead. These methods are inferior to the use of a proper killing bottle or chloroform, but may be useful at times.

RECENT REPORTS.

British Guiana. Report on the Botanic Gardens and their work for the year 1900-1901. By G. S. Jenman, F.L.S., Government Botanist and Superintendent.

This report contains an account of the general routine work at the Botanic Gardens with interesting and valuable notes on economic plants. The work on seedling and other canes carried out at the Gardens is not included in this report. The rainfall during 1900 was 88·94 inches, an increase of 36·24 inches on that of the previous year, but yet 4·06 inches below the mean of the last 21 years. The number of plants issued from April 1900, to March 1901, was nearly 20,000, valued at $2,061. Among the economic plants introduced into the Gardens during the year may be mentioned, the best varieties of Grenada cacao, the navel orange and native species of *Hevea*. Interesting notes are given on the large number of varieties of mangos under experimental cultivation, on Jamaica cocos (*Colocasia*), sweet potatos and artichokes. A variety of native cotton in which the cotton is easily removed from the seeds was obtained from the interior. A number of leguminous plants was grown for experimental purposes with a view to their utilization as green dressings. Numerous interesting natural history notes are given relating to native and introduced plants, and to those used as food plants by the native Indians in the interior. An account is given of the practical instruction carried out by the Agricultural Instructor in various parts of the Colony. There is a melancholy interest attached to this report, being the last by Mr. Jenman before his death. In fact the report appears to have been submitted by him the day before he died. He practically created the beautiful Botanic Gardens at Georgetown and carried on, in association with Professor Harrison, a long series of experiments with seedling and other canes. He made large collections of the indigenous plants of British Guiana and was a recognized authority on West Indian ferns.

The Economic Feeding of Plantation Stock under present conditions of high-priced grain, by Dr. W. C. Stubbs—Louisiana Sugar Planters' Association, March 15, 1902.
(Sugar Planters' Journal, March 22, 1902.)

The paper deals with the feeding of plantation stock—horses and mules.

A horse or a mule weighing 1,000lb can be maintained on 16½lb of hay or 10lb hay and 5lb of oats or 4lb of corn.

A horse exerting himself to the utmost consumes nearly one half more food per unit of work than with ordinary draft.

A 1,000lb. horse requires 14·4lb of digestible food daily for moderate work, 13·6lb for average work and 16·6lb for heavy work. This requires 10lb of timothy hay with 11·5, 15 and 20lb of mixed corn and oats for the three kinds of work.

The Louisiana sugar mules weigh 1,200lb, and do very heavy work. Each requires 18·32lb of digestible nutrients per day. The practice in Louisiana is to feed the mules with 12lb of pea vine hay and 16lb of grain. This supplies 19·48lb of digestible nutrients and appears to contain too much protein.

A change in feeding is desired on account of the high prices of corn and oats. Dr. Stubbs suggests a ration of pea vine hay, cotton seed meal and molasses—(1) 12lb pea vine hay, 10lb molasses and 6lb cotton seed meal. This ration contains 18·73lb. digestible nutrients with an albuminoid ratio of 1 : 4·4. The 6lb. of cotton seed meal may be altered to (2) 3lb. meal and 6lb. of corn, or (3) 2lb of meal and 9lb of corn. The sound diet would give 20·74 lb digestible nutrients or an albuminoid ratio of 1 : 5·4 ; the third 21·33lb. digestible nutrients or an albuminoid ratio of 1 : 5·9.

The saving in the case of these three diets above is 17·3, 12·6, and 9·7 cents per day per mule.

Those intending to adopt the new diets are advised to begin with 1lb of cotton seed meal per day and gradually increase up to the ration adopted.

Molasses is fed to stock in Louisiana extensively with excellent results, a mule eating daily with relish 8 to 12lb. Dr. Stubbs thinks it almost a criminal waste to sell molasses a few cents per gallon and buy hay, corn and oats at present prices.

The use of cotton seed meal is likely to increase as a stock feed on account of its low price. Six pounds per day is the maximum quantity recommended, and this quantity should be approached gradually.

Ceylon: Cacao Canker in Ceylon. Circular No. 23 of the Royal Botanic Gardens, Ceylon. By J. B. Carruthers, F.L.S. October, 1901.

The writer of this pamphlet has evidently had excellent opportunities for studying the cacao canker disease in Ceylon, having spent upwards of a year in investigating the life-history of the fungus and visiting the various estates in the Colony.

From the account given of the general symptoms and the microscopic characters of the disease, it would appear that the canker disease of Ceylon is very similar to that of the West Indies, and that both are apparently caused by closely related fungi. In Ceylon, however, the disease seems to have done far more damage than in the West Indies, as Mr. Carruthers speaks of whole estates having been wiped out thereby. Further, in Ceylon the canker fungus attacks cacao pods to a considerable extent which, so far, does not seem to have been recorded in the West Indies. Much work, however, still remains to be done both in Ceylon and in the West Indies to clear up all the questions relating to the cacao fungi and their work.

The fungus *Phytophthora* is mentioned as appearing on cacao pods, but the part played by this form does not seem to have, so far, been fully investigated.

While the investigations of the life-histories and the part played by the fungi—*Nectria* and *Phytophthora*—in the Ceylon cacao diseases, given in this Circular, are not yet quite complete, the paper is a valuable one from the practical side of the question, and for its suggestions for future work on the improvement of the cacao.

The relatively enormous number of young pods which die off, and the consequent loss of energy of the tree is alluded to, and the necessity of a study of this question emphasised. The starting point of such an inquiry would necessarily be the manner in which the cacao flower is pollinated. Useful information in experiment station work on the improvement of cacao might easily result from such an investigation.

It is pointed out that Forastero pods are not destroyed by fungi to the same extent as those of the 'old red' cacao of Ceylon, which have a thinner epidermis than those of Forastero. Again attention is called to the fact that some cacao trees bear their main crop in the dry season when the danger of fungoid diseases of the pod is at a minimum. The production of a new variety of cacao with a thick pod-epidermis, a smooth bark and a tendency to bear

its main crop in the dry season is suggested. Such plants would probably be more disease-resisting than those at present grown. Experiments in this direction are being made in Ceylon and the results will not fail to be of value to the West Indies.

The remedies suggested to check the Ceylon cacao disease, are practically identical with those already brought forward in the West Indies. (*West Indian Bulletin*, Vol. I., pp. 422-7; Vol. II., pp. 190-208). The cutting out of cankered spots gave better results than shaving off the diseased bark. The tarring of the wounds, made in pruning and cutting out cankered bark, is not insisted on in Ceylon where the cacao beetle does not seem to be a pest. Tarring is necessary in the West Indies both on account of the beetle and the danger of reinfection at the cut surfaces.

Moulds. Every one knows that articles of food and clothing become mouldy during very wet weather, or when placed in damp places. This mouldiness is caused by the growth of minute plants called fungi. Like all plants these mould fungi require water. We can check this mouldiness by removing the mouldy articles into drier places when the fungi die for want of water. In dry places there is little danger of moulds since a considerable degree of moisture is necessary for their development.

Fruit packing. One of the first conditions for success in the packing of tropical fruit is that each fruit or bunch of fruits should be separated from the rest by some suitable packing material. Thus oranges are wrapped separately in paper. Under these conditions decay is prevented from spreading from one or two rotten oranges through the whole package. The decay of fruit is largely brought about by fungi.

HAND-BOOKS TO THE WEST INDIES.

The following Hand-books afford interesting information of a descriptive, statistical and general character respecting the West Indies. They also contain particulars respecting the imports and exports and the agricultural resources of the Colonies enumerated :—

Hand-Book of Jamaica for 1902, comprising Historical, Statistical and General Information concerning the Island. Twenty-second year of publication. London : Edward Stanford, 26 and 27 Cockspur Street. Jamaica : Government Printing Office, Kingston.

British Guiana Directory and Almanack for 1902. Georgetown, Demerara : C. K. Jardine.

Trinidad and Tobago Year Book, 1902. Thirty-seventh year of issue. Compiled by James Henry Collens. Port-of-Spain : Muir, Marshall & Co.

The Mirror Almanack and General Commercial Directory of Trinidad and Tobago. Port-of-Spain : Mole Brothers.

The Grenada Hand-book, Directory and Almanack for the year 1902. Compiled by the Colonial Secretary. London : Sampson Low, Marston & Co., Ltd.

The St. Lucia Hand-book, Directory, and Almanac for 1902. Compiled by Everard G. Garraway, Castries, 1902.

The Barbados Directory and West Indian General Advertiser, 1901. Compiled by S. J. Fraser. Bridgetown, Barbados : King & Co :

Lightbourn's West Indian Directory and Commercial Directory. J. N. Lightbourn, St. Thomas.

AGRICULTURAL INSTITUTIONS IN THE WEST INDIES.

Jamaica Board of Agriculture : *Chairman* : The Hon'ble Sydney Olivier, C.M.G.; *Secretary* : W. R. Buttenshaw, M. A., B.Sc. ; *Publication*—Occasional Bulletin.

Jamaica Agricultural Society (with thirteen affiliated Branches). Kingston, Jamaica. *President* : Sir Augustus W.L. Hemming, G.C.M.G. *Deputy Chairman* : Hon'ble Wm. Fawcett, B.Sc., F.L.S. *Secretary* : John Barclay. *Publication* : "Journal of the Jamaica Agricultural Society."

Royal Jamaica Society of Agriculture & Commerce & Merchants' Exchange, Kingston, Jamaica. *President* : Hon'ble Lieut-Colonel Ward, C.M.G. *Secretary* : J. L. Ashenheim. *Publication* : Annual Report.

The Institute of Jamaica : Kingston, Jamaica. *Chairman* : Sir Fielding Clarke. *Secretary* : Frank Cundall, F.S.A., *Curator of Museum* :———*Publications* "Journal of the Institute of Jamaica." "Jamaica in 1901."

Kingston & St. Andrew Horticultural Society. Kingston, Jamaica. *President* : Hon'ble Wm. Fawcett, B.Sc. *Secretary* : William Harris, F.L.S.

British Guiana Board of Agriculture, Georgetown, Demerara. *Chairman* : Hon'ble A.A. Ashmore, C.M.G. *Deputy Chairman* : J. B. Harrison, C.M.G., M.A., F.I.C., F.G.S., F.C.S. *Secretary:* Oscar Weber.

British Guiana Royal Agricultural & Commercial Society Georgetown, Demerara. *President* : Luke M. Hill, B.A., M.I.C.E. *Secretary* : Thomas Daley. *Local Secretary* : (Berbice,) Dr. C. F. Castor. *Assistant Secretary and Librarian* : J. Rodway, F.L.S.. *Curator of Museum* : Richard Evans, M.A., B.Sc., *Publication* : "Journal of the Royal Agriculture and Commercial Society of British Guiana."———

Trinidad Agricultural Society, Port-of-Spain, Trinidad. *President* : Sir Alfred Moloney, K.C.M.G. *Secretary* : Edgar Tripp. *Publication* : "Proceedings of the Agricultural Society of Trinidad."

Grenada Agricultural Society, St George's, Grenada. *President* : Sir Robert B. Llewelyn, K.C.M.G. *Secretary:* W. E. Broadway. *Publication* : Minutes of Meetings.

Barbados General Agricultural Society & Reid School of Practical Chemistry, Bridgetown, Barbados. *President* : Sir. George C. Pile, Kt. *Secretary* : J. H. Poyer. *Publication* : "Barbados Agricultural Gazette and Planters' Journal."

St. Lucia Agricultural Society, Castries, St. Lucia—*President* : Sir H. L. Thompson, K. C. M. G. *Secretary* : R. G. McHugh.

Dominica Agricultural Society, Roseau, Dominica. *President* : The Hon'ble Hesketh H. Bell. *Secretary* : E. A. Agar.

Antigua Agricultural Society. *President*———*Secretary* : W. N. Sands.

St. Kitts-Nevis Agricultural Society. *President :* Honourable E. G. Todd. *Secretary :* C. A Smith.

[Further particulars of Agricultural and Horticultural Institutions in the West Indies would be gladly received for this list. Also fixtures for Agricultural Shows for 1902.]

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is desirable that inquiry be made, beforehand, as to the terms on which such produce will be received, and whether the market is favourable or not.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—
B. S. Bayley, Water Street Georgetown.
TRINIDAD—
J. Russell Murray, Port-of-Spain.
BARBADOS—
T. S. Garraway & Co., Bridgetown.
ST. LUCIA—
Captain H. Henville, Contractor and Agent, Castries.

MARKET REPORTS.

London,—April 15, 1902.—Messrs. J. Hales Caird & Co., and Gillespie Bros. & Co.

Aloes—Socotrine 80/- per cwt. Cape, 30/- to 36/- per cwt.
Bees-Wax—Jamaica, £7. 12. 6. to £8. 0. 0. per cwt.
Cacao—Grenada, fair to good 54/- to 58/- per cwt. Trinidad 63/- per cwt.
Cardamons—Mysore, 1/2 to 3/- per lb.
Coffee—Jamaica, good ordinary, 40/- to 45/6. Bold 65/- to 74/6. Peaberry 47/- to 60/6.
Costa Rica, good to fine, 61/- to 83/6 per cwt.
Peaberry, 64/6 to 100/6 per cwt.
Cotton—Carriacou $4\frac{7}{8}$c. per lb.
Ginger—Jamaica, common dark to fair 34/- to 42/- per cwt. Fair to bold bright 49/- to 60/- per cwt.
Honey—Jamaica in barrels 13/6 to 17/- per cwt. In tins 15/- to 20/- per cwt.
Lime Juice—Raw, common to fair, 11*d*. to 1/1. Good to fine 1/2 to 1/3 per gallon. Concentrated, £12 per pipe.
Mace—1/- to 2/6 per lb.
Nutmegs—8*d*. to 2/4 per lb.
Oil of Limes—Dominica distilled 1/- per lb. Hand pressed 4/4 per lb.
Pimento—3*d*. to $3\frac{1}{8}d$. per lb.
Rubber—Para, 2/1 to 3/2 per lb. Central American 1/8 to 2/4 per lb. African 1/11 to 2/9 per lb.
Sugar—West India Crystals, 14/9 to 16/3 per cwt. duty paid.
Muscovado—Jamaica, good brown 11/9 per cwt.
Molasses—nothing doing.
Tamarinds—14/- per cwt.
Logwood—£4. 5. 0. to £4. 10/- per ton.
Fustic—£4. 10/- per ton.

New York,—April 4, 1902.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaicas, 9 hands $1.10 to $1.15, 8 hands 80c., 7 hands 55c. per bunch.
Cacao—African $12\frac{3}{4}$c. to 13c. Caraccas, good ordinary $14\frac{1}{2}$c. to 15c. Fine quality 17c. to 18c.
Grenada, 12c. to $12\frac{3}{4}$c. Jamaica 11c. to $11\frac{3}{4}$c.
Trinidad $13\frac{1}{2}$c. to $14\frac{1}{2}$c. per lb.
Cocoa-nuts—Jamaicas, $21.00 per M. Small Trinidads $14.00 per M.
Coffee—Good ordinary, Rio, $5\frac{7}{8}$c. and fair quality, Jamaica, $6\frac{1}{4}$c. to 7c. per lb.
Ginger—Ordinary to small medium, 7c. to 8c. per lb.
Pimento—Good quality $5\frac{3}{4}$c. per lb.
Rubber—Nicaragua Scrap 51c. per lb.
Guayaquil Strip $48\frac{1}{2}$c. per lb.
Sugar—Muscovado, 89° $3\frac{7}{8}$c. Centrifugals 96° $3\frac{1}{2}$c.

INTER-COLONIAL MARKETS.

Antigua,—April 23, 1902. Messrs. C. W. Bennett, Bryson & Co., Ltd.

Molasses—8c. per gallon package included.
Sugar—Muscovado $1.05 per 100lb.

Barbados,—April 26, Messrs. T. S. Garraway & Co.

Arrowroot—good quality, $2.75 per cwt.
Cacao—$12.11 to $12.29 per 100lb.
Coffee—Jamaica and Rio $9 to $10.25 per 100lb.
Hay—$1.30 per 100lb.
Molasses—$7\frac{1}{2}$c. per gallon and $4.00 for package.
Onions—$7.50 per 100lb.
Potatos—Nova Scotia $1.80 to $2.00. Bermudas $4.00 per barrel.
Rice—Ballam $5.00 per bag. Patna $3.75.
Sugar—Muscovado, in hogsheads,—$1.05 per 100lb. and $5.00 for hogshead, in bags,—$1.25 per 100lb.

British Guiana,—April 24, 1902. Messrs. Weiting & Richter.

Arrowroot—$6.50 per barrel.
Cacao—(nominal) 11c. to 12c. per lb.
Cassava Starch—$5.00 per barrel
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica 12c. to 13c. per lb.
Eddoes—$1.20 per 100lb.
Onions—Lisbon (retail) strung 4c., loose 3c per lb.
Pea Nuts—American (retail) $4\frac{1}{2}$c. to 5c. per lb.
Plantains—24c. to 40c. per bunch.
Potatos English—$2.25 to $2.50 per barrel.
Rice—Ballam $4.90, Patna $5.65 per bag.
—Creole Rice 20c. per gallon, retail.
Sweet Potatos—Barbados $1.68 per 100lb. Creole $1.32 per 130lb.
Tannias—$1.20 per 100lb.
Yams—$2.00 per 100lb.
Molasses—First Yellow 16c. per gallon including package.
Sugar—Dark Crystals $1.57 to $1.60 per 100lb. Yellow Crystals $2.25 to $2.40 per 100lb.
Timber—Greenheart 32c. to 40c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00. per M.

Trinidad,—April 24, 1902. Messrs. Edgar Tripp & Co.

Cacao—$13.00 to $13.50 per cwt.
Coffee—(Venezuelan) $7\frac{1}{2}$c. per lb.
Hay—(nothing doing)
Onions—$2.50 per 100lb.
Potatos English—$1.45 to $1.76 per 100lb.
Rice—Ballam $4.65. Seeta $5.90 per bag.
Molasses—(no quotation)
Sugar—(no quotation)

Some enemies of scale-insects. Among the natural enemies of scale insects, various fungi seem to be of importance. If citrus-plants, badly affected by scale-insects, are closely examined, reddish looking fungoid growths are to be made out on some of the scales. The scale-insects on other plants besides the citrus family are also apparently destroyed by fungi. Any examples of scale insects with fungi upon them would be very acceptable at the Department laboratory.

Publications on sale of the Imperial Department of Agriculture

FOR THE WEST INDIES.

The 'WEST INDIAN BULLETIN.' A Quarterly Scientific Journal.

VOLUME I contains full reports of the West Indian Agricultural Conferences of 1899 and 1900; also papers on Moth-borer, Sugar-cane experiments, Agricultural education, Cacao diseases, etc.

As only a very limited number of copies of this Volume are now available, the parts can no longer be sold separately. Volume I complete, in the original paper covers as issued, post free, 5*s*.

VOLUME II contains the report of the Conference of 1901, with the President's Address, papers on the Sugar Industry, General and Educational subjects in full. Amongst the topics treated of are Recent Experiments with Sugar-cane, Sugar-cane diseases, Rubber planting in the West Indies, West Indian Fisheries, Cacao diseases, Rice, Sweet potatos, Citrate of Lime, etc. The Volume is illustrated by two coloured plates and other illustrations.

Price in original paper covers as issued, post free, 2*s*. 9*d*.

VOLUME III. Number 1. Agricultural Conference of 1902: President's Address, Minutes of the proceedings and papers relating to the Sugar Industry and Agricultural Boards, and the Report of the Chemical Section.

Price 6d. Post free. 8*d*.

Number 2. Conference of 1902 (continued). Educational and General Papers. (In the press).

PAMPHLET SERIES.

The Pamphlets are written in a simple and popular manner and the information contained in them is especially adapted to West Indian conditions. They contain amongst other subjects, summaries of the results of the experiment work on sugar-cane and manures, the full official reports of which have only a limited circulation. The following list gives particulars of all the pamphlets which are still available. The missing numbers are out of print and can no longer be supplied:—

(3.) Seedling and other Canes at Barbados 1900. Price 2*d*. Post free 2½*d*.
(5.) General Treatment of Insect Pests, 2nd Edition Revised. Price 4*d*. Post free 4½*d*.
(6.) Recipes for cooking Sweet Potatos. Price 2*d*. Post free 2½*d*.
(7.) Scale Insects of the Lesser Antilles. Price 4*d*. Post free 5*d*.
(8.) Cultivation of Vegetables in Barbados. Price 2*d*. Post free 2½*d*.
(9.) Bee-keeping in the West Indies. Price 4*d*. Post free 5*d*.
(10.) Manures and Leguminous Plants at Barbados, 1898-1901. Price 4*d*. Post free 5*d*.
(11.) Hints for School Gardens. Price 2*d*. Post free 2½*d*.
(12.) Seedling and other Canes in the Leeward Islands, 1900-1901. Price 2*d*. Post free 2½*d*.
(13.) Seedling and other Canes at Barbados, in 1901. Price 4*d*. Post free 5*d*.
(14.) Screw worm in Cattle at St. Lucia. Price 2*d*. Post free 2½*d*.
(15.) Plain Talk to Small Owners. Price 2*d*. Post free 2½*d*.

'NATURE TEACHING.'

A text-book based upon the general principles of Agriculture for the use of schools, prepared by the Honourable Francis Watts and others. (Pages XII and 199) The Plant, the Soil, Plant food and Manures, Weeds, and Insects are successively treated, and the information given is illustrated throughout by simple experiments which can readily be carried out in an ordinary school. The Book is mainly intended for the use of Teachers. Price, limp cloth 2*s*., or in a superior style of binding 2*s*. 6*d*. Postage, in either binding, 3½*d* extra.

The 'AGRICULTURAL NEWS' A Fortnightly Review.

The 'Agricultural News' will contain extracts from official correspondence and from progress and other reports; notes on interesting points connected with the work carried on at the Government Laboratories, Botanic Stations, Experiment Stations, Agricultural Schools, Experiment plots, School plots, Agricultural shows, Lectures to teachers, etc., the occurrence of disease, the arrival of new plants and animals, the flowering and fruiting of plants of special note, the appointment, promotion and removal of officers, the weather, and, in fact, any information indicating what is going on in each Colony and the progress made in Agricultural matters throughout the West Indies.

The 'Agricultural News' will be printed in time to be distributed, regularly, by each mail, and will be on sale by the local agents of the Department at one penny per number, post free 1½*d*. The subscription price, including postage, is 1*s*. 7½*d*. per half-year, or 3*s*. 3*d*. per annum. The work of distribution is intended to be carried on mainly by the local agents or through the post.

Agents.

The following have been appointed agents for the sale of the publications of the Department:—

London: Messrs. DULAU & Co., 37, Soho Square, W. *Barbados*: Messrs. BOWEN & SONS, Bridgetown. *Jamaica*: THE EDUCATIONAL SUPPLY COMPANY, 16 King St., Kingston. *British Guiana*: Mr. C. K. JARDINE, 'Daily Chronicle' Office, Georgetown. *Trinidad*: Messrs. MUNRO, & Co., Frederick St., Port-of-Spain. *Tobago*: Mr. C. L. PLAGEMANN, Scarborough. *Grenada*: Messrs. F. MARRAST & Co., 'The Stores,' St. George. *St Vincent*: Mr. W. C. D. PROUDFOOT, Kingstown. *St. Lucia*: Mr. R. G. MCHUGH, Castries. *Dominica*: Messrs. C. F. DUVERNEY & Co., Market St. Roseau. *Montserrat*: Mr. W. LLEWELLYN WALL, Plymouth. *Antigua*: Messrs. BOWEN & SONS, St. John's. *St. Kitts*: Messrs. BOWEN & SONS, Basseterre. *Nevis*: Messrs. BOWEN & SONS, Charlestown. *Virgin Islands*: Messrs. BOWEN & SONS, Road Town, Tortola.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. I. No. 3. BARBADOS, MAY 24, 1902. PRICE 1*d.*

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Quality of Produce.

IT is important to bear in mind that in our efforts to improve the quality of produce grown and shipped in the West Indies we should recognize that there are certain initial difficulties likely to be met with that can only be overcome by sympathetic and judicious action. In the case of peasant proprietors who sell their small lots of coffee, cacao, honey and fruit to local merchants, it is almost impossible for the latter to discriminate between a few lots that show extra care in cultivation and curing, and the great bulk of produce which is admittedly of inferior quality. It is this great bulk that fixes the price and swamps and destroys the value of the small lots. This subject is touched upon in the *Journal of the Jamaica Agricultural Society* for April. As the result of the employment of travelling Agricultural Instructors the small proprietors are paying more attention to the cultivation of their crops. They are not only obtaining an increased yield, but they are also endeavouring to improve the quality of their produce.

When, however, such men take their produce to the local store they too often find that they can only obtain the same price as before. There is not enough of it to be shipped alone and 'it goes into, and is lost in, the bulk of lower grade.' The fault does not, always, lie with the local merchant. It would really pay him better to give a higher price for good produce because it gives less trouble and always finds a market.

If, for instance, he is paying 34*s.* for ordinary cacao and a good sample of fermented and cured cacao is offered to him, he may be willing to pay 3*s.* or 4*s.* more for it because of its better quality. Unfortunately he does not get enough to make a separate shipment. He must therefore mix it with the lower class of cacao for which he gets only

ordinary prices. There is another point. It has sometimes happened that samples are drawn on the other side from the two or three bags containing a proportion of the well cured cacao. When the shipment is delivered, as it is not equal to sample, and the contrast is so great, the merchant who has, already, paid a higher price for the good cacao is, in addition, liable to be mulcted in 'allowances.'

There is no doubt as to the existence of the difficulties above referred to. They are, admittedly, only temporary, but they are real enough in their effects on the small cultivator to check him in his desire to improve the quality of his produce. We have drawn attention to them in order that they may be removed, so that the path of the industrious and painstaking cultivator may be rendered easier, and the quality of West Indian produce may be gradually and steadily improved. The Boards of Agriculture and the Agricultural Societies might take up the subject and give careful consideration to it. The circumstances in each Colony will probably require separate treatment. Something might be done by encouraging organization amongst the small proprietors and by assisting groups of them in certain districts to ship their own produce. Later, when the quantity of well cured produce has perceptibly increased and regular shipments of uniform quality can be made, the local merchants will then be only too glad to deal with them.

SUGAR-CANE EXPERIMENTS AT BARBADOS.

The following progress report has been received from Prof. d'Albuquerque and Mr. J. R. Bovell, on the work done from December 1900 to April 1902 :—

There are 7,313 experiments covering an area of 70¼ acres to be reported on. The following is a detailed list of the stations giving the number of plots and area under experiments.

EXPERIMENTS WITH MANURES.

Of the 605 manurial experiment plots, covering an area of seventeen and a half acres, twenty-six were in 'Summervale' field at Dodds, 230 in 'Mill' field at Foursquare, thirty in 'Nineteen Acre' field at the Pine and 319 in 'Ashford Hill' and 'Hopper' fields at Hopewell. Of these latter, the 173 plots in 'Ashford Hill' field were with plant canes and the 146 in 'Hopper' field, with first ratoons.

At Dodds the cuttings planted in December 1900 germinated regularly and a good stand of canes was established at an early time. They continued to make good growth and a heavy yield per acre was obtained.

At Foursquare the cuttings first planted grew so badly that it was necessary to use the same variety for replacing the cuttings that failed to germinate.

The canes of the manurial plots at Hopewell grew well, but we regret to state that a considerable number of the plots were attacked with a fungus disease which is likely to affect seriously the correctness of the results obtained.

EXPERIMENTS WITH SELECTED SEEDLINGS AND OTHER CANES.

Of this group of experiments, containing 268 plots extending over an area of seventeen and one third acres, there were at Henley thirty-one plots of plant canes in 'Long' field and twenty-one of first ratoons in 'Upper' and 'Lower Garden' fields: at Coverley thirty-two plots of plant canes in 'Old Well' field and twenty-two of first ratoons in 'Middle Caminus' field; at Husbands thirty-one plots of plant canes in 'Four Acre' field: at Blackmans thirty plots of plant canes in 'Big Betty' field, twenty-six of first ratoons in 'Guava Hole' field, and twenty of second ratoons in 'Wish' field, and at Waterford thirty-three plots of plant canes in 'Dixon' field and twenty of first ratoons in 'Three Acre' field.

A fairly good stand of canes was obtained on all of the plots of this group with the exception of the plant canes in 'Big Betty' field at Blackmans.

EXPERIMENTS WITH SEEDLING CANES (OTHER THAN FIRST YEAR) AND DIFFERENT NAMED VARIETIES.

In this section of the experiments there were 2,071 plots with an area of about thirty-two and a half acres. The largest number of these plots viz :—1,607 were in 'Foster' field at Waterford. At Dodds there were 342 plots in the following fields, viz :—thirty-four in 'Lower Chapel,' fifty-four in 'Well,' twenty-five in 'House,' thirty-seven in 'Mill,' seventy-two in 'Upper Padmore,' seventy in 'Lower Nightingale,' and fifty in 'Pasture.' In 'Garden' field at the Pine there were seventy-six plots, in 'South Ginger' field at Oughterson ten, in 'Upper Dodds' field at Sunbury sixteen, and at Hampton fourteen plots of plant canes in 'Street' field and six plots of first ratoons in 'Twelve Acre' field.

On the whole the canes on these plots grew so well that little supplying was necessary. Some of these new seedlings such as Sport Ribbon, Sport White, B. Nos. 1203, 1225, 1264, 1270, 1369, 1462, 1529, 2563, 3054, 3204, Q. No. 3, T. Nos. 24, 77 and 111 have given promising results, so far as their saccharine richness is concerned. Their future growth, their resistance to drought, their ratooning capabilities and the weight of canes per acre will be carefully noted, and, if subsequent results justify it, their cultivation will be rapidly extended.

EXPERIMENTS WITH SEEDLING CANES OF THE FIRST YEAR'S GROWTH.

4,369 seedlings were raised and planted in 'Pear Tree' field at Waterford estate in June 1901. Owing to the prolonged drought they suffered somewhat from

remaining in the pots too long, and, after they were planted, from the excessive rainfall in the latter half of June and in July and August.

It was hoped that these canes would have been sufficiently matured by April or May 1902, to allow of their being tested, so that only those containing rich juice should be re-planted. Owing, however, to the reasons given above, this could not be done, and so now these will have to be re-planted next December solely by their field characters.

We desire to state that only a certain number of the above plots have been reaped. Seedling and other sugar-canes which were found unsuitable for further cultivation when tested in 1901 were not re-planted the following December, consequently they were not tested this year.

CHEMICAL SELECTION PLOT.

In 1900 nine plots of top cuttings taken from canes of B. No. 147, which had been tested for their saccharine richness, were, with the permission of Mr. H. E. Thorne, planted at Sandy Lane in a field which could be irrigated. These cuttings were divided into three groups according to their degree of richness, and each was further subdivided into three lots: so that the first plot which is known as 'High-high' contains the richest juice of the richest group. 'High-middle' contains the medium rich canes from the richest group and so on down to the ninth plot, which contains the poorest canes of the poorest group.

SEEDLING CANES AT BRITISH GUIANA.

At a meeting of the Board of Agriculture of British Guiana held on April 28, last, the secretary read the following statement prepared by Professor Harrison from the returns rendered to the Sugar-cane Experiments Committee in answer to its circular letter of February 15, addressed to the managers of sugar estates asking for statistical returns of the varieties of sugar-cane, other than the Bourbon, in cultivation in British Guiana :—

Varieties other than Bourbon are being grown on 25 plantations in the county of Demerara, on 7 plantations in the county of Essequebo, and 6 in the county of Berbice : or on 38 plantations in British Guiana.

Of these plantations thirty have areas of more than one acre of one kind of variety under cultivation ; 21 are in Demerara, 5 in Essequebo, and 4 in Berbice. The remaining 8, 4 of which are in Demerara, 2 in Essequebo, and 2 in Berbice have only small areas of varieties of canes used as nurseries in order to obtain canes for planting out larger areas.

Many of the plantations which are growing varieties of canes on a relatively large scale have nurseries of several or of many varieties the cultivation of which they intend to gradually extend.

Returns have not been received from two plantations, and these are included among those which are not taking part in the search for improved varieties of canes. Including these there are 15 plantations in British Guiana on which the Bourbon is the only kind of cane cultivated. Five of these plantations are in Demerara, two in Essequebo, and eight in Berbice.

The areas used for the experimental cultivation of the varieties other than Bourbon on the estates participating in the inquiry vary very greatly, from seven acres as the minimum to about 1,600 as the maximum.

One plantation in Demerara has an area of over 1,500 acres occupied by large scale experiments with varieties of canes, while one in Berbice has over 1,100 acres similarly occupied.

The following shows the various acreages devoted to these experiments :

	Plantations in Demerara.	*Essequebo*	*Berbice.*
Over 1,500 acres ...	1		
" 1,100 acres ...	—	—	1
Between 500 & 600 acres	1	—	
" 400 & 500 acres	1	—	—
" 300 & 400 acres	1	—	
" 200 & 300 acres	2		
" 100 & 200 acres	4	2	1
" 50 & 100 acres	5	—	1
Under 50 acres... ...	6	3	1

The returns show that in British Guiana 6,282 acres are occupied with large scale experiments in varieties of sugar-cane other than Bourbon, 4,538 acres being in Demerara, 1,372 in Berbice and 372 in Essequebo.

The following shows the varieties other than Bourbon which are at present cultivated in British Guiana on areas of more than one acre in extent :

Name or Number of cane	*No. of plantations*	*No. of acres*
White Transparent ...	24	1,899
D. 109	20	1,727
D. 78	15	629
B. 147	19	599
D. 145	14	442
D. 95	9	335
D. 74	10	216
D. 625	11	79
D. 115	8	72
B. 208	1	43
Purple Transparent ...	3	49
B. 109	3	41
Sealy	3	40
B. 116	4	36
Burke	1	28
306 B	1	10
117	1	9
Samsara...	2	8
130	3	8
156.B	1	6
Green tree	3	5
B. 41	2	4

SUGAR-CANE EXPERIMENTS AT ANTIGUA.

The following extract from the Report of the Meeting of the Agricultural and Commercial Society of Antigua, held on May 2, gives a brief summary of the results of the past season's experiments with seedling and other canes in that island :—

Mr. Watts gave a brief preliminary account of the results of reaping the plant canes of the varieties under experiment cultivation in Antigua in 1901-2. He prefaced his remarks by saying that he thought it was to the interest of planters that they should be informed at the earliest possible moment of the results of these experiments so that they might have opportunities of saving such canes as appeared to possess merit, before the reaping season is over. Planters are thus enabled to establish nurseries of promising varieties from which they may draw supplies for more extensive planting at the end of the year.

Twenty-three kinds of cane were grown, each on fourteen several plots. Taking the mean of all the results, the order of merit, based upon the pounds of cane-sugar per acre in the juice, was as follows :—

1.	B. 208.	12.	Caledonian Queen.
2.	B. 109.	13.	Mt. Blanc.
3.	D. 130.	14.	D. 115.
4.	D. 95.	15.	Rappoe.
5.	Sealy Seedling.	16.	D. 116.
6.	D. 102.	17.	D. 145.
7.	Naga B.	18.	Red Ribbon.
8.	Burke.	19.	D. 78.
9.	B. 156.	20.	White Transparent.
10.	B. 306.	21.	B. 147.
11.	D.74.	22.	Queensland Creole.
		23.	B. 176

Reference was made to the tonnage of cane and the quality of juice afforded by each kind of cane, attention being directed to the great richness and high purity of the juice from B. 208. and D. 95., both of which canes appear very suitable for planting in Antigua.

The list of twenty-three canes given above contains many which were not under trial last year. It is interesting to remove these and to compare the order of merit with the order arrived at last year and also with the order deduced from the average results of three years' experiments : we thus arrive at the following :—

Order in 1901-2.	*Order in 1900-1.*	*Order on Average of three years.*
1. B. 109.	1. D. 95.	1. D. 95.
2. D. 95.	2. Mt. Blanc.	2. B. 109.
3. D. 102.	3. Naga B.	3. Naga B.
4. Naga B.	4. Burke.	4. Burke.
5. Burke.	5. D. 102.	5. D. 102.
6. Cal. Queen.	6. Red Ribbon.	6. Caledn. Queen.
7. Mt. Blanc.	7. Wt. Transparent.	7. Mt. Blanc.
8. D. 115.	8. Queens. Creole.	8. Rappoe.
9. Rappoe.	9. Caled. Queen.	9. Wt. Transparent.
10. D. 116.	10. Rappoe.	10. D. 115.
11. Red Ribbon.	11. B. 109.	11. B. 147.
12. Wt. Transparent.	12. B. 147.	12. D. 116.
13. B. 147.	13. D. 116.	13. Queens. Creole.
14. Queensld. Creole.	14. D. 115.	

(Red Ribbon not grown in 1900).

These orders show very fair concordance, the most striking feature perhaps being the high position which B. 109 occupies this year, a position Mr. Watts attributed to the unusually heavy rainfall of the past season. He therefore urged planters to be cautious with regard to this cane and not to plant it extensively without further trials.

Mr. Watts stated that the experiments with ratoon canes in Antigua were not yet complete, but judging from the results already obtained in St. Kitt's, he felt justified in saying that B. 208. will be found to ratoon satisfactorily. In the course of a few weeks he hoped to be able to lay before the planters a short account of the ratoon experiments from which they may obtain information as to the ratooning qualities of the canes, such as B. 208., D. 95. and other canes which are now attracting their attention.

Mr. Watts next exhibited specimens of two fungi attacking sugar-canes—one, *Thielaviopsis ethaceticus* which is the fungus referred to as killing newly planted tops in the paper by Mr. Howard in the *West Indian Bulletin*, Vol. III., pp. 73-86. The other fungus, *Marasmius*, appears to have been seen here frequently, but hitherto we have been unaware of its dangerous character.

On concluding his address Mr. Watts was accorded a hearty vote of thanks for bringing the information he had just given to the Society to the notice of the planters at so early a date.

PARA RUBBER.

This account of the tree yielding the Para rubber of commerce, and the conditions under which it grows in its native country is taken from the Cantor lectures on 'Plants yielding Commercial India-rubber' delivered before the Society of Arts by Dr. Morris in April 1898 :—

Para rubber derives its name from the town and province of that name in Brazil. It is rightly regarded as the most valuable of any in commerce. The price of Para rubber practically governs that of all other rubbers. The tree or trees, for probably more than one species is utilized, are distributed throughout the vast region of the Amazon valley and adjoining areas, and occupy an area about two-thirds the size of Europe. The principal tree yielding Para rubber is the 'Seringa,' *Hevea brasiliensis* (syn. Siphonia brasiliensis), belonging to the natural order *Euphorbiaceae* or Spurges, numerous members of which secrete a milky juice.

Fig. 7 Branch of Para Rubber Tree.

Hevea brasiliensis (Muell.)

Showing trifoliate leaves and numerous small flowers. The female flowers are larger and at the ends of the sprays. In the lower right hand corner is a fruit (capsule) cut open to show the position of the seeds, usually three in number. Above it is a single seed, one half natural size.

The tree is upright and grows to a large size, up to 60 feet in height, with a trunk 6 to 8 feet in circumference. The branches, when the trees grow closely together, are short ; the leaves are compound and trifoliate. The whitish-green flowers are male and female in the same panicle, the female usually larger and terminal. The fruit is a large dry capsule composed of three one-seeded pieces. The seeds are the size of filberts with a shining seed coat marked with black blotches ; the interior substance is very oily. On this account the seeds soon lose their vitality. In the Lower Amazon valley the trees flower in January, and

the seeds ripen at the beginning of the dry season, in July and August.

Hevea brasiliensis grows in the moist, hot forests of the province of Para, and especially in the district near the numerous mouths of the Amazon, known as the islands. It probably extends far inland into the province of Amazonas, but its exact distribution is not clearly known. Other species of Heveas, eight or ten in all, are found not only in Brazil, but also in Venezuela, Guianas, Peru, and Bolivia.

The district where *Hevea brasiliensis* flourishes, is in South latitude 1° ; the climate is remarkable for its uniformity of temperature, usually not exceeding 87° Fahr. at mid-day, or below 74° at night. The greatest heat recorded is 95°, and the mean for the year is 81°. The rainfall occurs principally during the months of January to June, the maximum being in April, when it reaches 15 inches. For the remaining six months, little rain falls, but the air is always loaded with moisture. The whole country is covered with dense, almost impenetrable, forests, and the soil near the numerous and gigantic rivers is deep, heavy, and very fertile. Some of the low-lying country, where the rubber trees grow, is annually flooded, and is very damp and unhealthy. Under cultivation in Ceylon it has been found that the trees will also flourish on well-drained soils beyond the reach of floods.

Mr. Kerbey, the American Consul at Para, states :

'The rubber tree thrives well both on high and low land ; but in order to yield a large supply of milk it must have plenty of moisture in the soil part of the year at least. For example, on the river Purus, where the flood plains are covered with water from one to three or four months in the year, the trees on these levels yield milk in abundance, while large trees of the same sort, not reached by the floods, do not pay for the trouble of tapping them. On the Lower Amazon not only the trees on the tide flats, and annual flood plains yield milk in paying quantities, but also those on the high land (*terra firma*) because the rains of six months or more in the year supply abundance of water to the soil.' He continues : 'The territory from which Para rubber is gathered is nearly or quite as extensive as all the United States lying east of the Rocky Mountains. Some of the Para rubber has to come as far to reach Para as it has to travel from Para to reach New York.'

The great value of Para rubber trees has naturally suggested the desirability of introducing the cultivation into other countries. Seeds of *Hevea brasiliensis* were introduced to Kew in 1872, through Sir Clements Markham, K.C.B. (then Mr. Markham), and a first case of living plants was safely taken out to India by Dr. King, the Superintendent of the Botanic Gardens at Calcutta, in the following year. Since that time the Government of India has taken up the introduction of this valuable tree on a large scale. In 1875 Mr. H. A. Wickham was commissioned to collect seeds in Brazil, and he arrived at Kew with 70,000 seeds of which 1,900 plants in 38 Wardian cases were, however, despatched from Kew to Ceylon (as the climate of Calcutta was found unsuitable to them), where they arrived in excellent condition. Small lots of plants were also distributed at the same time to the West Indies, the West coast of Africa, Singapore, and Java. In 1876 Mr. Robert Cross, who had been sent to South America to bring home living plants in case the seeds brought by Mr. Wickham failed to germinate, arrived at Kew with 1,000 plants. The greater number of the survivors of these was also forwarded to Ceylon to be grown for distribution to India, and the rest to Mauritius, Singapore and Queensland. Para rubber trees are now well established in various parts of India and in most of our Eastern possessions.

THE CARE OF PASTURES.

In several of the West Indian islands there are extensive pastures on which stock are annually raised but not in sufficient numbers to supply the local demands for fresh meat. To meet this deficiency cattle are imported from Venezuela, Porto Rico, and elsewhere. If some means could be found to render the British West Indies self-supporting in this respect, not only would a considerable sum of money, now spent elsewhere, remain in the islands, but remunerative employment would be available for a section of the population. There can be little doubt that the existing pastures, if carefully handled, are capable of supporting more stock than at present. The subject of the care of pastures has already received some attention from the Department of Agriculture, and a paper on the subject by the Hon. Francis Watts appeared in the *West Indian Bulletin* (Vol. 1 p. 410). In this paper, the systematic grazing of pastures after dividing them by suitable fencing, the prevention of pasture fires, the use of shade trees for the stock and the cutting of grass for hay, were advocated as suitable means for the improvement of the Antigua pastures. Mr. C. W. Meaden, manager of the Government Farm in Trinidad, makes (*West Indian Bulletin*, Vol. II, p. 162) somewhat similar proposals for dealing with the pastures in Trinidad, where £40,000 is annually spent on the supply of meat. In this connexion, a recent experiment carried out by the United States Department of Agriculture on the improvement of cattle ranges in Central Texas is of interest. (*Bulletin No. 13., Bureau of Plant Industry*, by H. L. Bentley).

A range, below the average quality, 640 acres in extent, with a carrying capacity of 40 head of mixed cattle, or 1 to 16 acres, was selected by the Department. The experiment lasted three years and was concluded in April last, when the carrying capacity of the range was estimated to be 100 head of mixed cattle for the 640 acres, an increase of more than 100 per cent. The actual cost of the improvements did not exceed 75 cents per acre, for the three years, but the rental value had increased from $5 per acre in 1898, to $10 in 1901, a net increase of $4.25 per acre or $2,720 from the section of 640 acres.

The section was divided into a number of fields by suitable fencing. The result of the experiment demonstrated that under the conditions obtaining in Texas (1) it pays to cultivate pastures with disk or iron-tooth harrows ; (2) it pays to rest pastures periodically during the period when the grass seeds are maturing and falling to the ground ; (3) that various leguminous plants such as alfalfa, sainfoin, cow peas, velvet beans are suitable for annual or temporary pastures and for hay purposes ; (4) that the sowing of the seeds of permanent pasture grasses can be utilized to good advantage. The bulletin concludes with a description of the hay and pasture plants recommended for Central Texas.

A Cockroach Trap. Many devices have been suggested from time to time to destroy these common household pests. The following is simple and has also proved very successful. An empty guava-jelly pot is placed upright on the floor in places infested with cockroaches. The insects are attracted by the sweet jelly and readily enter the pot. Once inside they are unable to climb up the slippery sides, and remain prisoners. As many as a dozen large cockroaches may be trapped in a single night in one of these jelly pots.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the Imperial Commissioner of Agriculture, Head Office: Barbados. It is particularly desired that no letters be addressed to any member of the staff by name. Such a course will entail delay in dealing with them.

Communications should always be written on one side only of the paper. It should be understood that no contributions or specimens will, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Local Agents and not to the Head Office. Where no Agents exist subscriptions at the rate of 3*s*. 3*d* per annum, payable beforehand, will be received at the Head Office.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News.

Vol. I. SATURDAY, MAY 24, 1902. No. 3.

NOTES AND COMMENTS.

Death of Sir Harry Thompson, K.C.M.G.

St. Lucia has suffered a severe loss by the sudden death of Sir Harry Thompson on April 28. In the official announcement of the sad occurrence Lieut. Col. J. R. M. Dalrymple-Hay, the Acting-Administrator says, 'I am sure that I am but giving expression to the sentiment of the people of St. Lucia in deploring the loss which the Colony has sustained by the untimely death of an Administrator whose abilities and energies were entirely devoted to the public good, and in sympathising with Lady Thompson, who shared her husband's interest in the Colony and its people.'

Sir Harry had taken an active personal interest in the efforts to improve the agricultural conditions of St. Lucia.

Plant Proclamation at Dominica.

On page 14 of this Journal we drew attention to the Proclamation which had been issued at St. Lucia forbidding the importation of cacao plants or seeds from South America, in consequence of the warning given by the Imperial Department of Agriculture of the prevalence of a dangerous disease of cacao in Surinam. A similar proclamation was issued at Dominica on April 24, prohibiting absolutely the importation into the Presidency of all plants, seeds, berries, earth, soil or other article or thing packed therewith, or any goods, packages, coverings, or other articles or things which may come directly or indirectly from Continental South America and which there is reason to believe may be affected by disease.

Sir Henry Jackson, K.C.M.G.

The Agricultural and Commercial Society of Antigua, at a meeting on the eve of Sir Henry Jackson's departure to take up the Governorship of Fiji, passed this resolution:—

'This Society desires to place on record the sense of the great loss sustained by the removal at so early a date of his Excellency Sir Henry M. Jackson, K.C.M.G., from the government of this Colony . . . . . at the same time recording its high appreciation of the interest taken by his Excellency in the industries of the Presidency and of his efforts to render them prosperous. The Society desires to express the heartiest good wishes for his Excellency's future.'

Rice Cultivation in British Guiana.

With a view to encouraging rice growing in British Guiana, a large rice mill was erected in Georgetown some time ago. This venture was not successful, owing to special circumstances, and the mill passed subsequently into the hands of Messrs. Weiting and Richter (*West Indian Bulletin*, Vol. II., p. 281.) They report that the mill was re-opened last year, and is encouraging growers to plant larger areas in rice than hitherto. The prospects for the first of the year's crops are said to be promising, but no paddy will be available for the mill for several months. In 1900, British Guiana produced 14,669 tons of paddy, equivalent to 10,701 tons of rice.

The Possibilities of Bee-Keeping.

Amongst the papers read at the recent annual meeting of the Bee-keepers' Association of Ontario, was one describing how a man had, single-handed, managed 500 colonies of bees. He had struggled on 'under difficulties that would have discouraged any ordinary mortal,' but was finally so successful as to secure, during the last three years, on an average, 20,000 lb. of comb honey per annum. At 28*s*. per cwt. this would realize £250 or $1,200.

Spineless Lime Trees.

In 1892 on Shawford estate, Dominica, a lime tree was noticed without the usual formidable spines. Seeds from this apparent 'sport' were collected and sown. Some 75 per cent. came true and a plot of spineless limes forms an interesting feature in the Dominica Botanic Garden. The plants in this plot are now bearing heavily, and the Curator, Mr. Jones, reports that 80 to 90 per cent. of the seedlings raised are coming true. The fruit of the spineless variety is slightly below the average in size, and it remains to be seen whether, for estate requirements, the new variety is an improvement or not.

Onions at Antigua.

The onion crop has not been so satisfactory as last year owing to the heavy rain in certain districts. In several places over 70 inches were recorded and the

average was 45 inches. In districts where the soil was light or the rainfall about 45 inches splendid onions have been grown. That the planters are not discouraged is indicated by the fact that three times the quantity of seed ordered last season has been engaged for this year's planting. The chief damage by rain was done in the seed-beds which on several estates were, with the young seedlings, washed away.

Vegetables for the Boers at Antigua.

There will be a greatly increased demand for vegetables and fruit when the Boer prisoners and the troops arrive in the island. The latter were due on May 13, and the former about June 1. At this time of the year locally grown provisions are not plentiful, and in any case it is not likely that Antigua will be able to supply all requirements, so that Dominica, Montserrat and the other islands of the Colony will no doubt find a ready sale for such products. One enterprising merchant who has a contract for fresh vegetables is distributing seed free to growers in the Liberta and Valley districts.

Lagos Silk Rubber at Tobago.

A plot of the African or Lagos silk rubber (*Funtumia elastica*) was planted at the Botanic Station Tobago, in April 1901. The Curator reports that the plants have made good growth and flowered for the first time this month. Mr. Millen adds that in a young state the plant assumes a shrubby habit, but by pruning it can be made to form a trunk. In Lagos it attains a height of from 90 to 100 feet before branching. This makes it easy for the collector to tap the trunks. The latex flows readily and rubber is easily produced by the hot and cold water process, no chemicals being required as in some rubber-producing trees. From its rapid growth the tree is apparently adapted for cultivation in Tobago.

Vanilla in Tahiti.

The Journal of the Board of Trade for January 23, 1902, reports that the French Government has fixed '1,000 Kilograms [22,046 lb.] as the quantity of vanilla produced in French establishments in Oceania (Tahiti and its Dependencies) which during the period from July 1, 1901, to June 30, 1902, is to be allowed a reduction of 50 per cent. of the ordinary import duty on importation with France.'

In 1899 Tahiti exported 130,113 lb. of vanilla. The price realized was very low, only 4*s*. 5¼*d*. per lb. owing largely to faulty preparation. The Consular Report on the Trade of the Society Islands for 1899, says that 'Tahiti vanilla properly cured before shipment generally finds a fair market, although it cannot compete in quality with that from Bourbon, Seychelles, Fiji and the West Indies.'

Shipment of Logwood.

The quantity of logwood shipped to Europe during last year is the smallest on record for ten years, and the statistics, which have been issued by the well known firm of Benekendorff, Berger and Co. of London and Jamaica, show that there is a steady decline in the importation of that product into the principal markets of Europe.

During last year 9,628 tons of logwood, straight and roots, were shipped from Jamaica to Europe; and of this quantity 6,343 tons went to Havre, while 1,765 tons were landed at ports in the United Kingdom, and 1,231 tons went to Hamburg. The largest consignments received in Europe during the period under review were from Santo Domingo and Haiti, and they amounted to 41,676 tons. Honduras is credited with 17,827 tons. The total importations reached 99,662 tons, or fully 30,812 tons below the receipts for 1900.

The following figures of logwood shipped to Europe from various countries for the past nine years may be of interest, 1893, 188,664 tons; 1894, 208,185, tons; 1895, 225,779 tons; 1896, 262,930 tons; 1897, 185,336 tons; 1898, 160,069 tons; 1899, 160,494 tons; 1900, 155,649 tons; 1901, 124,837 tons.—(*Jamaica Telegraph*).

Flowering Bamboo.

A clump of bamboos, probably the common species (*Bambusa arundinacea*) is reported to be flowering in Windsor Forest Road, Grenada. Bamboos vary greatly in their flowering periods. Some species flower frequently, whilst others, amongst them the one in question, only at long intervals. In Further India, the home of *Bambusa arundinacea*, the bamboos flower over large tracts of country simultaneously. In Brazil, plagues of mice and rats have occurred after the flowering of the bamboos and the subsequent enormous production of seed.

Volcanic Ash at St. Vincent.

The Curator of the Botanic Station, St. Vincent, reports that about 3 p.m. on Wednesday, May 7, pieces of scoriae fell thickly at the Botanic Station and grey ashes also fell to a depth of about one quarter of an inch during Wednesday afternoon and night. Fortunately very little damage was done to the Station.

United States Fisheries.

Prof. H. F. Osborn LL.D., of Columbia University, contributes to *Harper's Magazine* for March an interesting article on the United States Fish Commission Station and Marine Laboratory at Woods Holl. The article is well illustrated and gives a good account of some of the work carried on at the Station.

PEASANTS' PLOTS AT BARBADOS.

Among the crops grown by the peasantry in Barbados are the cereals, Indian and Guinea corn, and peas and beans such as pigeon peas, rouncival pea, increase pea, bonavist and bean. These are not grown separately, because, in most cases, the plot is not large enough, the desire and aim of the peasant being to get as many crops as possible out of his land. Hence cereals are sown side by side with other crops on the same land. Peasants' plots vary in size from one rood to one or two acres. In the early part of the year, during the dry season, the soil is prepared by being forked or hoed, manure is put in, and cane and corn holes are dug. Early in the month of June, when the rainy season sets in, seed is sown. Indian corn is planted on each side of the cane holes, sometimes in alternate rows ; Guinea corn is sown at shorter distances apart than Indian corn : bonavist, peas and beans are sown around the hedgerows and sometimes inside the plot. When ripe, the crops are reaped. On small plots the Indian corn is sold, as it stands, to women who break off the ears and prepare them for market by cutting the ends and stripping off a few of the thin leaves which cover the grain. In this state the cob is retailed at the rate of three or four ears for one cent, and is cooked by roasting. On larger plots the corn is allowed to remain in the fields until it is quite dry, when it is sold at about 80 cents a bushel. This corn is ground in small mills into meal which sells at the rate of from two to four pints for 10 cents.

Guinea corn, if allowed to seed, fetches about 80 cents a bushel, but it is used chiefly as fodder for cattle and fetches from 5 to 6 cents per 100 lb. In dry seasons, when other fodder is scarce, it rises to as much as 40 cents per 100 lb. With regard to the peas and beans, they are picked when ripe and sold to hucksters who retail them, shelled, at the rate of two to three pints for 10 cents.. Pigeon peas are sometimes allowed to dry on the bushes and then command the same price as in the green state.

Each of these crops could be more extensively grown to supply the wants of the population and thus lead to the reduction of the large importations from America and elsewhere. Better crops could be obtained if more care were taken in selecting only the best seed for planting, and if the seed were sown at proper distances. In planting Indian corn, for instance, the seed should be taken from full, sound ears (see *Agricultural News*, p. 26) and not more than three grains should be put in a hole. When the corn has reached a height of ten or twelve inches, all sickly and weak-looking stalks should be pulled out. So too with Guinea corn ; it is often planted too thickly, too many grains are put into one hole, and sufficient care is not taken to see that the seed planted is sound and free from blight. More than six grains of Guinea corn should not be planted in one hole where the corn is intended for seed. For fodder, eight grains are enough ; and even then, to ensure a healthy growth, all thin, weak-looking shoots should be pulled up. All these plants grow readily in shallow, friable soil, and better crops are always obtained by manuring.

Mole Crickets. These pests, known in St. Lucia as 'Cochon terre,' have been doing considerable damage recently to roses, tomatos, oranges and other plants at the Botanic Station at St. Lucia. Methods for dealing with this destructive creature are given in the *West Indian Bulletin*, Vol. II, p. 349.

SCREW WORM.

In continuation of the information respecting the screw worm given on p. 8 of this Journal we may mention that a full account of the insect is contained in *Bulletin No. 5, New Series, Division of Entomology*, United States Department of Agriculture, 1896, and among other information we notice a suggestion that may, possibly, prove useful at St. Lucia. In applying carbolic acid or other liquids to wounds infected with screw-worm maggots, there is sometimes a difficulty in getting the liquid to penetrate to the extremities of wounds. This may easily be effected by using an ordinary oiler or oil-can by which a few drops can be placed in the wound without waste. Such oilers are used for applying oil to sewing-machines and cycles and have a spring bottom or other device whereby a few drops of liquid can be thrown out. A small oil-can of this nature, to hold half an ounce or an ounce of carbolic acid, should prove useful in treating wounds. In the United States they use an ordinary conical zinc oil-can of about four ounces capacity and find it very satisfactory. There should be no difficulty in obtaining such an oil-can locally and we commend this practical hint to the attention of stock-owners in St. Lucia.

COMPOSITION OF THE BREAD FRUIT.

The following analysis of the bread fruit is recorded in the *Experiment Station Record*, Vol. xii, p. 1076 :—

Water	46·21	per cent.
Protein	2·34	„ „
Fat	0·40	„ „
Starch	41·42	„ „
Crude Fibre	4·20	„ „
Ash	1·78	„ „
Undetermined	3·65	„ „

In comparison with the sweet potato and yam (which agree very closely with one another in their chemical composition) the bread fruit contains 25 to 30 per cent. less water, about 25 per cent. more starch and a distinctly higher proportion of protein or nitrogenous matter. Expressed in other words, whilst one pound weight of sweet potato or yam contains about twelve ounces of water and two ounces of starch, one pound of bread fruit contains about six and a half ounces of starch and only seven of water. Although superior as a food stuff so far as actual chemical composition is concerned, the presence of over four per cent. of fibrous matter in the bread fruit is a point in which it compares unfavourably with the sweet potato and yam.

Stingless Bees. Stingless bees are not uncommon in the West Indian islands, living wild and making nests in trees. A colony is to be seen in the Dominica Botanic Station and is worth a visit. The bees are small and very active, and become very excited if the nest is disturbed. Even though one knows they are stingless, it is hard to remain near the nest when the bees become angry and fly about just as the real honey-bee does : one instinctively fears a sting, and instinct in this case proves stronger than reason. The bees belong to an undescribed species of *Melipona*, a genus which includes numerous tropical stingless bees.

THE PURCHASE OF ARTIFICIAL MANURES.

The following is the first portion of a paper which appeared in the *Journal of the Board of Agriculture* for March 1902 :—

There are three substances, and only three, that are valued in artificial manures, namely, nitrogen, phosphates, and potash. According, therefore, to the greater or less quantity of one or other of these substances the value of the manure will rise or fall. Some manures contain only one of these substances—for instance, nitrate of soda and sulphate of ammonia contain only nitrogen ; super-phosphate, precipitated phosphate, and basic slag contain only phosphate ; and kainit, sulphate of potash, and muriate of potash contain only potash—while other manures hold two substances of value, as in the case of bones, which furnish both nitrogen and phosphates, or saltpetre (very seldom used, however, as a manure), which supplies both nitrogen and potash. Only one class of so-called artificial manure, namely, Peruvian or other similar guano, contains an important amount of all three substances.

NITROGEN.

In price lists nitrogen is frequently expressed as ammonia. The relationship between the two substances is, however, a very simple one, and need occasion no difficulty or uncertainty : 17lb. of ammonia always contain exactly 14lb. of nitrogen, or, what is the same thing from the farmer's point of view, 14lb. of nitrogen are the equivalent of 17lb. of ammonia. If, therefore, a sample of, say 'corn manure' is offered as containing 4·5 per cent. of ammonia, this is the same as saying that it contains 3·7 per cent. of nitrogen. Sometimes, though not often, the figure is made to look more attractive by being stated as sulphate of ammonia ; but this also need cause no difficulty, if it be remembered that 66lb. of this substance are equivalent to no more than 14lb. of nitrogen or 17lb. of ammonia. If, therefore, we take the above example, the figures mean one and the same thing, whether they are stated as 3·7 per cent. of nitrogen, or 4·5 per cent. of ammonia, or 17·4 per cent. of sulphate of ammonia. But a manure merchant who failed to effect many sales for a fertilizer of ever so high-sounding a name on a statement of 1 per cent. of nitrogen or 1·2 per cent. of ammonia might be more successful with a certain class of buyer if he entered the nitrogen as equal to 4·7 per cent. of sulphate of ammonia, and yet the three figures all represent the same fact. Under the Fertilizers and Feeding Stuffs Act, 1893, the invoice must contain the minimum guarantee of nitrogen, stated as such.

PHOSPHATES.

Phosphates or phosphate of lime may also be entered in an analysis or price list in several ways, but as a rule this ingredient is either stated as above or as phosphoric acid. In an invoice, however, the statement must be made as soluble or insoluble phosphates, as the case may be.

The relationship between phosphates or phosphate of lime, whether soluble or insoluble, and phosphoric acid is quite as simple as that between nitrogen and ammonia : 142lb. of phosphoric acid always form 310lb. of phosphate of lime, so that to convert the former into the latter one may multiply by 2·2 which, though giving an answer slightly above the truth, is quite accurate enough for all ordinary purposes.

If, therefore, the analysis of a manure is returned as 12 per cent. of phosphoric acid, it is equivalent to saying that it contains fully 26 per cent. of phosphates. Similarly 30 per cent. of phosphates is equal to nearly 14 per cent. of phosphoric acid.

POTASH.

Potash usually exists in manures in the two forms of sulphate of potash and muriate or chloride of potash. It takes 94·2lb. of pure potash to form 174·2lb of sulphate of potash, whereas the same amount of potash will form only 149·2 lb. of the muriate or chloride. In the former case, therefore, to convert potash into terms of sulphate of potash we multiply by 1·85, whereas in the latter case we multiply by 1·58. If, therefore, an analysis of, say, kainit is stated as 12·5 per cent. potash, that is equivalent to saying that it holds over 23 per cent. of sulphate of potash : while muriate of potash guaranteed to contain 56·8 per cent. of potash is of about 90 per cent. purity.

Just as a buyer may sometimes be led into purchasing a manure through its nitrogen being expressed as sulphate of ammonia, so may the contents of potash be made to look more attractive by being stated as sulphate of potash. In an invoice, however, the potash must be stated as such.

The rules for approximately converting the various terms into their equivalents may be thus summarised :—

To convert	Nitrogen	into terms of	Ammonia	multiply by	1·2
" "	Nitrogen	" " "	Sulph. of Am.	" "	4·7
" "	Phosphor. Acid	" " "	Phosphates	" "	2·2
" "	Potash	" " "	Sulph. of Potash	" "	1·85
" "	Potash	" " "	Muriate of Potash	" "	1·58

Nitrogen and phosphates, and, to a less extent, potash, vary in effectiveness, and therefore, in value, according to their source or origin. Nitrogen is never so effective as when in the form of nitrate of soda. [See 'Note added' Ed.] It is not quite so active, and for some purposes not so valuable, when in the form of sulphate of ammonia, though under certain circumstances this somewhat slower action may be regarded as an advantage. Nitrogen in what is called the organic form is in its least active condition, though here again the rapidity and effectiveness of action vary greatly. Nitrogen is in the organic form in blood meal, fish meal, bones, shoddy, etc., and yet, as a source of plant food, blood meal is more active than these other substances. It is claimed as an advantage for slow-acting manures that they last longer, which is true ; but one applies manures not to last, but to act. It is only where it is convenient to apply manure at somewhat long intervals, as in the treatment of orchards, that the more inert manures are worthy of much consideration.

As regards phosphatic manures, it may be said that while soluble phosphates are all alike active, there is considerable difference in the value of insoluble phosphates. The insoluble phosphate of bone meal, for instance, is less effective, and for most purposes less valuable, than the insoluble phosphate of basic slag, precipitated phosphate, or even dissolved bones. Some of the insoluble phosphate of the last manure has once been soluble, and has 'reverted,' and such phosphate is not much less effective than soluble phosphate. But raw bones as a manure have been longer known to British farmers than other forms of phosphate, and for this reason their price has kept relatively high.

[NOTE ADDED]

With regard to the statements above relative to

the superiority of nitrate of soda, as a source of nitrogen, to sulphate of ammonia, it must be remembered that the conditions which obtain in temperate regions are referred to. Experiments in Barbados have shown that sulphate of ammonia produces better results in sugar-cane cultivation than nitrate of soda. Sulphate of ammonia is changed, by nitrification in the soil, into nitrate of calcium. Nitrification is very active in tropical soils, and this fact, together with the liability to loss by leaching in the case of nitrate of soda, may explain the superiority of sulphate of ammonia in certain tropical lands.

BEE-KEEPING.

St. Vincent.

The following notice descriptive of the steps taken to establish the bee-keeping industry at St. Vincent is taken from the *Sentry* of March 21, last:—

Some months ago when the Imperial Commissioner of Agriculture made his first attempt to encourage the development of bee-keeping in this Colony, we heartily supported the idea, deeming it one which, with a small outlay, and little attention would prove, not merely an interesting avocation to any person, but in a short time a money-making concern. We are gratified in the fact that within the brief period of not even a year, the growth of the little industry is clearly visible; and Mr. Powell, the local representative of the Imperial Department of Agriculture has been encouraged in pursuing the idea of developing the project, by the many eager applications, from bee-keepers or from persons intending to go in for the enterprise, for information and supplies, some of the latter being on sale at cost price at the Botanic Station; a list may be had on application. Mr. Powell is of the opinion that the bees around Kingstown are doing well and the outlook at this season for a good crop of honey is very promising. It may not be generally known that a 'Solar wax extractor,' a duplicate of which is easily made, may be seen at the Botanic Station. A 'Cowan's honey extractor' is expected shortly from America. Italian colonies of bees can be imported by the local Agricultural Department from Jamaica at seven shillings each, freight included, for any person desiring the same. Up to date, this year, we are informed, seventeen such colonies have been imported with entire satisfaction.

POULTRY.

Mr. W. B. Tegetmeier, in *The Country* for April, puts forward these hints which may be useful to those who are desirous of keeping fowls, in good condition, in small enclosures:—

In no circumstances should the birds be over-crowded. A useful plan has recently been suggested of maintaining the ground in a pure condition, where a number of birds are kept in a confined space, by placing the poultry-house in the middle of a square plot of ground, and dividing this by lines running diagonally to each corner, the house being so constructed that an opening may be admitted as desired into each plot. The fowls for a certain time are kept in one of the four yards, the other three being cultivated with quick-growing vegetables, and, as the crops are cleared off, the fowls are transferred from one to the other, the plot that they have left being immediately utilized by re-sowing either with some profitable crop or some seed which will produce herbage for the birds. In this way, with a little judgement, the fowls can be transferred from one plot to another without the ground becoming tainted, as the growing plants rapidly exhaust the injurious qualities of the manure. We have seen very good results from this system in the abundance of eggs and in the growth on plot after plot of really useful vegetable products. But, keeping a number of fowls, as is often done, in a small pen year after year, is objectionable, for the ground becomes foul and putrid, and the birds lose health and prolificacy.

AGRICULTURAL EFFORTS AT MONTSERRAT.

The island of Montserrat suffered severely in the hurricane of 1899, and the original plans for the establishment of an Experiment Station had to be abandoned. Early in 1900 sites were selected by the Travelling Superintendent of the Imperial Department of Agriculture, for Experiment Stations, at the Grove, Olveston, and Harris' Village. Great care was taken to select land, representative of the surrounding district, in each case, and the thanks of the Department are due to the Montserrat Company for their ready co-operation.

The Stations have been enclosed, roads and paths made, and the land divided up into plots on which during the past year experiments have been conducted with Guinea corn, maize, potatos, ginger, arrowroot, etc. Permanent economic plants are also being established. Nurseries of economic plants have been formed and up to December 1901, 53,413 plants had been distributed free, and 75,182 sold, in addition to large quantities of seeds, yams, etc. The nurseries contain, at present, about 40,000 plants. School plots are maintained at Olveston and Harris' Village Stations, for the use of boys of the neighbouring schools.

Two courses of lectures to teachers in charge of elementary schools have been given by Mr. G. Whitfield Smith, the Travelling Superintendent. These were both well attended and much appreciated. The acting Bee-expert visited the island and gave lectures and practical demonstrations on bee-keeping. As a result of his visit a considerable amount of interest has been taken in the subject. An apiary is being established at each Station and a stock of bee-keepers' supplies is now kept at the Grove.

Two Agricultural Shows have been held, one at Plymouth, and the other at Harris' Village, supported by grants from the Imperial Department of Agriculture. Keen interest was displayed in many of the classes, and English potatos and onions were amongst the more interesting exhibits. In order to improve the local breeds of stock, the Department has introduced three Berkshire boars, and three rams.

Recently an Agricultural Society has been formed with his Honour the Commissioner, Mr. F. H. Watkins, as President, and the Rev. G. W. Johnson as Secretary. An address of Mr. F. H. Watkins entitled, *A Plain Talk to Small Owners at Montserrat*, has recently been issued as No. 15 of the Pamphlet series of the Imperial Department of Agriculture and may be obtained from the local agents for 2*d*. Post free 2½*d*.

EDUCATIONAL.

Agricultural Education at St. Kitts.

It was, at one time, proposed to start an agricultural school at St. Kitts similar to those already established at St. Vincent, St. Lucia and Dominica. Afterwards, it was considered preferable to support an agricultural side to the Grammar School recently opened in the Presidency. The Grammar School has made a successful start under Mr. W. H. Mitchell, M.A., formerly of York School, Jamaica. The Imperial Department of Agriculture has made a grant to provide an Agricultural Master (Mr. John Belling, B.Sc. Lond:) and a certain number of scholarships to boys who enter on the agricultural side.

School Plots at St. Kitts.

Mr. Francis Watts has contributed these interesting notes on this subject:—

I had an opportunity of seeing the elementary school plots in the Botanic Station at St. Kitts and of talking over the question of agricultural instruction in the elementary schools, with Mr. Sprott the master of the Wesleyan school, who has taken the leading part in attempting this kind of instruction in the island.

He has a large class in the school itself working on the lines of *Nature Teaching*; this he thinks is satisfactory. He has also a class of ten boys (ten boys go also from the Moravian school), who go to the Botanic Station at stated periods and there cultivate the small plots placed at their disposal. He finds,—as I have all along anticipated,—that there is some difficulty in making this sort of work of a sufficiently educational character. The boys have worked up the beds, grown crops of tomatos, cabbages, beans, radishes, etc., have sold their crops and now will have to repeat most of what they have already done. Again during the growth of their crops Mr. Sprott has often been at a loss to find occupation for the boys during the period allotted for this work.

This work is however very valuable and the boys are greatly interested in it. The only question which arises in connexion with it is its place in the educational system. It should, I suggest, come as a final course occupying six months or a year. Possibly some means can be found for extending the technical teaching by making the boys take part in some of the work going on at the Station, thus filling in the time when no work is necessary on the garden plots. Mr. Lunt [the Curator of the Botanic Station] doubtless can arrange this kind of work. I would merely suggest, provisionally, that such operations as spraying for insect and fungoid pests, repotting plants, pruning overgrown trees, assisting in reaping experiment crops and various minor operations in the gardens and experiment plots might be entrusted to the boys, thus extending their view beyond their own small plots. This of course would require care and judgement, but appears feasible. This work should come as the final advanced class of a more technical character and having in the eyes of the boys the additional charm due to the fact that they are permitted to sell the produce of their plots and retain the proceeds.

SCIENCE NOTES.

Vegetable Ferments.

It is well known that in animals the various food-substances are acted upon by a number of digestive juices, and rendered capable of use for the nourishment of the body. The active agents in these digestive processes are ferments. The saliva contains a ferment which has the power of converting insoluble starch into sugar. The digestive juices of the stomach act on meat and other proteids and change them into various soluble compounds. Pepsin is the ferment concerned. In the small intestine the food is submitted to the action of the pancreatic juice which contains the ferment trypsin, also capable of digesting proteids.

The presence of ferments in plants is often unrecognized, yet many exist, and the ordinary life processes of plants are as dependent on the action of ferments, as the process of digestion in animals. In the storing up of starch in the roots of a sweet potato, or sugar in the stem of a sugar-cane, ferments play an important part, (*West Indian Bulletin*, Vol. II., p. 257). More striking are the results of ferment action in the insectivorous plants, which catch and digest small insects.

The ferments of two plants of special interest in the West Indies are dealt with in recent papers by Professor Vines, F.R.S. (*Annals of Botany* December 1901, and March 1902). The well known power of the juice of the papaw to digest meat partially has, since 1873, been suspected to be due to a ferment. Many workers have investigated this question and Professor Vines comes to the conclusion that there is a ferment present, 'papain,' which is essentially similar in its action to the trypsin of an animal's body. (The commercial preparation of crude papain is described on p. 4 of this Journal). The juice of the pine-apple also contains a ferment, known as 'bromelin,' which is almost identical in its action. Both bromelin and papain are said to act most vigorously in neutral liquids.

The New Flora of Krakatoa.

The island of Krakatoa, near Java, was the scene of a great volcanic eruption in 1883. A considerable portion of the island was blown away, and the remainder completely covered in lava and cinders to a depth varying from three to about fifty feet. Dust was shot up into the air to an estimated height of seventeen miles, and was deposited over an area of 1,000 miles radius. Tidal waves were recorded all over the world, and atmospheric effects were noticed as far away as the West Indies and Brazil.

As one result of the eruption, the vegetation of the island was completely destroyed. In 1886 Dr. Treub, Director of the Botanic Gardens at Buitenzorg, Java, visited Krakatoa. No one had meanwhile lived on or visited Krakatoa, and any vegetation present was entirely new and had reached the island independently of man. The nearest land to Krakatoa is Java, 21 miles away, Sumatra is 37 miles distant. Dr. Treub found two distinct groups of plants. On the shore were seeds, fruits, and young plants, of nine species commonly found on tropical shores and on coral islands. These had doubtless been brought by the waves as drift fruits.

Inland, nineteen species were found, no less than eleven being ferns. The spores or 'seeds' of ferns are exceedingly minute and are readily carried by the wind. Of the eight flowering plants present, four were members of the order *Compositae*, the fruits of so many of which have special and often very beautiful contrivances to enable them to be readily

borne by the wind. The seed of the lettuce ('salad') give an everyday example. There is little doubt that the wind, and possibly birds, brought the seeds of the inland vegetation, and the sea those of the shore plants. Various lowly algae, (*Lyngyba*), seem to have first found a home on the surface of the lava, and by their growth and decay rendered it possible for the ferns and later the flowering plants to establish themselves.

PINE-APPLES AT ANTIGUA.

At the meeting of the Agricultural and Commercial Society, Antigua, on Friday May 2, Mr. Watts asked leave to call the attention of members to certain experiments with new varieties of pine-apples. Some months ago several new varieties of pine-apples were introduced through the instrumentality of the Imperial Department of Agriculture. Some of these were now fruiting: one variety, the Smooth Cayenne, was bearing fruits of such excellence that he would like to direct notice to it. He advised those who were interested to endeavour to see the fruit when it was brought into town for shipment on May 7. He also stated that he would be glad to hear from members and others interested in pine-apples whether they were desirous of obtaining plants of this variety, as he was in communication with Dr. Morris on the subject of obtaining a supply of plants for Antigua at reduced rates. It would be of advantage if those interested in the industry would inform him at an early date of their requirements in respect of this or of any other improved variety of pine-apple.

THE FALL OF VOLCANIC DUST IN BARBADOS.

A chemical and mineralogical examination of the volcanic dust that fell in Barbados, the sample used being the one collected by Dr. Morris at Chelston from 4 p.m. on the 7th., to 5.30 a.m. on the 8th. May, has been carried out at the Government Laboratory, Barbados. Professor d'Albuquerque reports the following results to date:—

The volcanic dust contains the following substances soluble in strong hydrochloric acid, iron oxide 4·7 per cent., alumina 12·5 per cent., lime 5·9 per cent., magnesia ·78 per cent., soda 1·2 per cent., potash ·08 per cent., silica ·1 per cent., sulphuric anhydride ·1 per cent., phosphoric anhydride ·04 per cent. Insoluble in hydrochloric acid, silicates 75·2 per cent. It also contains a trace of sulphides and a faint trace of sulphurous anhydride—a product of the combustion of sulphides and sulphur.

It is evident from the small percentage of potash and phosphoric anhydride that this dust will have no fertilizing value in Barbados soils, which already contain abundance of all the other constituents of the dust. It is probable, however, that, incorporated with the surface layers of our stiff clay soils, it may to some extent improve their texture. It contains nothing harmful to the land.

The following are the results of the mineralogical examination made by Dr. Longfield Smith.

A sieve analysis gave the following results:—

Diameter of particles	Percentage
1 to ·5 millimetre	0·01
·5 to ·35 "	3·06
·35 to ·20 "	7·21
·20 to ·15 "	66·20
·15 to ·10 "	0·89
·10 and less "	22·63
	100·00

The particles from ·5 to ·35 m.m. diameter are wholly composed of volcanic glass crowded with gas inclusions and containing small lath-shaped crystals of felspar. The gas inclusions are in many instances so numerous as to render the particles quite opaque. The particles of ·35 to ·2 m.m. diameter are composed partly of similar volcanic glass and partly of crystals of felspar. The particles ·2 to ·1 m.m diameter are almost entirely composed of mineral crystals: these minerals consist chiefly of lime and soda felspar and of a ferro-magnesian mineral not yet definitely determined. There is also a quantity of magnetite and a very few crystals of a dark blue doubly-refracting mineral not yet determined. The particles finer than ·1 m.m. diameter are chiefly composed of comminuted fragments of felspar.

A comparison of this volcanic dust with a sample obtained from the laboratory museum of that which fell in 1812 shows a striking difference between the two. The dust of 1812 is composed of much finer particles and these are almost wholly volcanic glass.

This points to the eruption of 1902 being of a much more violent nature than that of 1812. It is very rare to find so many mineral particles in volcanic dust scattered so far from the seat of eruption. These are generally sifted out by the wind from the lighter particles of glass. The fact that particles of magnetite, a mineral of specific gravity 5·5 to 6·5, of over ·1 m.m. diameter should be found in the dust over 90 miles from the seat of explosion is significant of the prodigious height to which the particles must have been ejected.

DEPARTMENT NEWS.

Dr. D. Morris, C.M.G., the Commissioner of Agriculture for the West Indies, left Barbados by the R.M.S. 'Solent' on Monday, May 12, for Montserrat and Dominica. He is expected to return to Barbados by the mail of the 24th. inst.

Professor J. P. d'Albuquerque did not leave for England by last mail as announced. It is probable that he will sail on the R.M.S. 'Para' to-day.

Mr. G. Whitfield Smith, Travelling Superintendent of the Department, left Barbados for Dominica. Mr. Smith will visit and inspect the Botanic Station, Agricultural School, and Experiment Plots in the island, and is due to return on the 24th.

RECENT REPORTS.

Notes on Insect Pests, 1901. A Report of the South-Eastern Agricultural College, Wye, England. By F. V. Theobald, M.A., F.E.S.

This Report deals with pests observed in England, especially in the southern counties, and contains much interesting matter. In discussing remedies for scale insects, the author places reliance on three methods:—spraying with caustic alkali wash, with resin wash, and fumigating with hydrocyanic acid gas. Mr. Theobald's caustic alkali wash is a powerful liquid, to be applied to *dormant* trees in winter. Unfortunately a liquid of such potency cannot be used in the West Indies where most plants are in more or less active growth through the whole year. The resin wash is similar to that recommended by the Department (see *West Indian Bulletin*, Vol. II., p. 180, and *General Treatment of Insect Pests*, 2nd. edition, p. 12) with the substitution of soft soap for whale oil. It is curious that whale oil and whale oil soap do not appear to be used in England to the extent they are in America and the West Indies, soft soap being frequently substituted.

With regard to fumigation, Mr. Theobald especially recommends it for green-houses. Fumigation is probably not practicable on a large scale in the West Indies at the present time. It has been tried in Montserrat in past years and there is no doubt that the process is fatal to scale insects. For the present, however, we must depend on the spraying machine, and we agree with Mr. Theobald in placing reliance on good washes.

Another section of the report, of interest in the West Indies, is that on the 'Introduction of foreign Ladybirds.' The ladybirds are a familiar group of small beetles that eat plant lice and scale insects; hence their importance to agriculture. Mr. Theobald wishes to supplement the native English ladybirds by the introduction of more voracious foreign ones that would keep plant lice in better check, and to this end he obtained three consignments from Tasmania. He has hopes that one of these may check the *Aphis* that is such a pest to hop-growers. We trust the experiment will meet with success. As a rule, such introductions do not seem to be successful; the beetles travel well and many arrive alive; but they do not appear to thrive in new localities Several unsuccessful attempts have been made in the West Indies. A number were imported some years ago to Montserrat to eat the 'scale' on the lime trees, but they appear to have had no lasting effect. In a more recent trial, the lizards enjoyed the beetles that were liberated. In America there have been some striking successes and numerous failures, and the general balance of opinion inclines to the unsuccessful nature of these attempts (see *West Indian Bulletin*, Vol. II, p. 337). Plant lice (*Aphides*) are kept in check in the West Indies by that most voracious little beetle *Cycloneda sanguinea*, the common red ladybird. Plant lice never get really abundant here, probably from the effective work of this beetle and other enemies.

British Guiana. Board of Agriculture. Report by Mr. Ward, Instructor in Agriculture, on a Visit to Trinidad, 1902.

Mr. Ward in company with Professor J. B. Harrison visited Trinidad, in returning from the Agricultural Conference at Barbados, for the purpose of obtaining some knowledge of the cultivation of cacao and other products as carried on in that island. En route, visits were paid to the Botanic Stations at St. Vincent and Grenada. The Botanic Gardens and St. Clair Experiment Station at Trinidad are shortly described. A visit to a district mainly cultivated by small settlers revealed an unsatisfactory condition of things. The trees were loaded with epiphytic growths, dead wood and broken branches, whilst on the ground decaying empty cacao pods were lying. Such conditions are very favourable to the spread of fungoid diseases. In pleasant contrast is the account of a visit to Ortinola estate, under the control of Mr. J. P. Bain. Ortinola is situated high up in the Maracas Mountains and is well sheltered, drained and watered. The methods practiced there of training cacao trees are described. The question of shade trees for cacao is discussed at some length. Mr. Ward is of opinion that the shade tree commonly employed in British Guiana, the 'Oronoque' tree (*Erythrina glauca*) gives too dense a shade, if planted at the distance apart found most suitable for its near relative the 'Bois Immortelle' of Trinidad. He recommends that in British Guiana the Orinoque tree, if used for shade, should be placed from 80 to 90 feet apart, diagonally. The report concludes with some interesting information relative to the possible establishment of a trade in plantains between British Guiana and Trinidad.

Tropical Timber and their rings of growth, by Herbert Wright, A.R.C.S., Scientific Assistant, Royal Botanic Gardens, Ceylon. Indian Gardening and Planting of August 22 1901.

The annual rings so characteristic of the wood of trees from temperate regions enable the age of trees to be readily determined as, on account of the definite seasons, each ring represents a year's growth. Such rings are particularly well seen in the wood of conifers, such as pine, etc. In the tropics where many of the trees are evergreen and the seasons are by no means well marked, the time represented by each ring of growth is not necessarily one year.

The problem of interpreting the rings of growth in tropical trees is complicated by the fact that, in the tropics every gradation exists between trees which are evergreen and those like 'Immortelles' which drop their leaves and remain leafless for several weeks or months each year. The dropping of the leaves before or during the dry season is evidently an adaptation on the part of the tree to prevent drying up. There are however some exceptions to this rule in Ceylon and elsewhere, where trees drop their leaves in the wet months and burst into leaf during the dry season. The author suggests that this is due to the migration of species to localities where the climate does not correspond with that from which they came.

In discussing the influence of climate on trees an interesting case is quoted from Dr. Watt's writings. Plants of an *Acacia*, native of New South Wales, where it flowered in October were introduced to the Nilgiris in India in 1845. Here they flowered in October up to 1850, but in 1860 they were observed to flower in September, in 1870 in August, and finally in 1882 in June, this being the 'spring' month in the Nilgiris corresponding with October in New South Wales. It therefore took nearly forty years for this species to regain its habit of flowering in the spring, *i.e.*, to become perfectly acclimatised.

CLIMBING PLANTS.

Mr. Percy Groom writes thus on this interesting group of plants in *The Country* for March :—

To those feeling a sympathetic interest in clinging plants, many questions will suggest themselves. What advantages does the climbing habit confer upon a plant? Briefly answered, the plant saves the expense of manufacturing a thick stem. This economy is rendered possible by the method of feeding that a plant adopts. Ordinary green plants derive their food from two sources—the soil and the atmosphere. They force their roots into the soil in order to absorb the necessary water and substances dissolved therein. They raise their foliage into the air and light, in order that the leaves may first absorb from the atmosphere carbon dioxide, and then, having split it up, may retain the carbon necessary as nutriment material. The leaves further have to get rid of the excess of water absorbed. The stem is a channel of communication between the leaves, flowers, and root, and has to bear the first two, but in itself it is neither an essential food-absorbing organ nor a necessary factory. The relative simplicity of the offices performed by the stem renders it possible for a plant to economize by producing a small stem. The stems of climbing plants can perform all the necessary functions save that of bearing the weight of foliage and flowers, and this they accomplish by leaning against their sturdier neighbours. The climbing plant has learnt to dispense with a thick stem, and to expend less material in its construction ; consequently it can devote to other purposes the nutritive substances that it thus saves.

HAND-BOOKS TO THE WEST INDIES.

The following Hand-books afford interesting information of a descriptive, statistical and general character respecting the West Indies. They also contain particulars respecting the imports and exports and the agricultural resources of the Colonies enumerated :—

Hand-Book of Jamaica for 1902, comprising Historical, Statistical and General Information concerning the Island. Twenty-second year of publication. London : Edward Stanford, 26 and 27 Cockspur Street. Jamaica : Government Printing Office, Kingston.

British Guiana Directory and Almanack for 1902. Georgetown, Demerara : C. K. Jardine.

Trinidad and Tobago Year Book, 1902. Thirty-seventh year of issue. Compiled by James Henry Collens. Port-of-Spain : Muir, Marshall & Co.

The Mirror Almanack and General Commercial Directory of Trinidad and Tobago. Port-of-Spain : Mole Brothers.

The Grenada Hand-book, Directory and Almanack for the year 1902. Compiled by the Colonial Secretary. London : Sampson Low, Marston & Co., Ltd.

The St. Lucia Hand-book, Directory, and Almanac for 1902. Compiled by Everard G. Garraway, Castries, 1902.

The Barbados Directory and West Indian General Advertiser, 1901. Compiled by S. J. Fraser. Bridgetown Barbados : King & Co.

Lightbourn's West Indian Directory and Commercial Directory. J. N. Lightbourn, St. Thomas.

AGRICULTURAL INSTITUTIONS IN THE WEST INDIES.

Jamaica Board of Agriculture : *Chairman* : The Hon'ble Sydney Olivier, C.M.G.; *Secretary* : W. R. Buttenshaw, M. A., B.Sc. ; *Publication*—Occasional Bulletin.

Jamaica Agricultural Society (with thirteen affiliated Branches). Kingston, Jamaica. *President* : Sir Augustus W.L. Hemming, G.C.M.G. *Deputy Chairman* : Hon'ble Wm. Fawcett, B.Sc., F.L.S. *Secretary* : John Barclay. *Publication* : "Journal of the Jamaica Agricultural Society."

Royal Jamaica Society of Agriculture & Commerce & Merchants' Exchange, Kingston, Jamaica. *President* : Hon'ble Lieut-Colonel Ward, C.M.G. *Secretary* : J. L. Ashenheim. *Publication* : Annual Report.

The Institute of Jamaica : Kingston, Jamaica. *Chairman* : Sir Fielding Clarke. *Secretary* : Frank Cundall, F.S.A., *Curator of Museum* :————*Publications* "Journal of the Institute of Jamaica." "Jamaica in 1901."

Kingston & St. Andrew Horticultural Society. Kingston, Jamaica. *President* : Hon'ble Wm. Fawcett, B.Sc. *Secretary* : William Harris, F.L.S.

British Guiana Board of Agriculture, Georgetown, Demerara. *Chairman* : Hon'ble A.M. Ashmore, C.M.G. *Deputy Chairman* : J. B. Harrison, M.A., C.M.G., ; *Secretary :* Oscar Weber : *Agricultural Instructor:* R. Ward : *Assistant Instructor in Agriculture :* J. E. Beckett (on probation) ; *Veterinary Surgeon* : J. A. Raleigh.

British Guiana Royal Agricultural & Commercial Society Georgetown, Demerara. *President* : Luke M. Hill, B.A., M.I.C.E. *Secretary* : Thomas Daley. *Local Secretary* : (Berbice,) Dr. C. F. Castor. *Assistant Secretary and Librarian* : J. Rodway, F.L.S.. *Curator of Museum* : Richard Evans, M.A., B.Sc., *Publication* : "Journal of the Royal Agriculture and Commercial Society of British Guiana."————

Trinidad Agricultural Society, Port-of-Spain, Trinidad. *President* : Sir Alfred Moloney, K.C.M.G. *Secretary* : Edgar Tripp. *Publication* : "Proceedings of the Agricultural Society of Trinidad."

Grenada Agricultural Society, St George's, Grenada. *President* : Sir Robert B. Llewelyn, K.C.M.G. *Secretary:* W. E. Broadway. *Publication* : Minutes of Meetings.

Barbados General Agricultural Society & Reid School of Practical Chemistry, Bridgetown, Barbados. *President* : Sir. George C. Pile, Kt. *Secretary* : J. H. Poyer. *Publication* : "Barbados Agricultural Gazette and Planters' Journal."

St. Lucia Agricultural Society, Castries, St. Lucia—*President* :————*Secretary* : R. G. McHugh.

Dominica Agricultural Society, Roseau, Dominica. *President* : The Hon'ble Hesketh H. Bell. *Secretary* : A. K. Agar.

Antigua Agricultural Society. *President*———— *Secretary* : W. N. Sands.

St. Kitts-Nevis Agricultural Society. *President :* Honourable E. G. Todd. *Secretary :* C. A Smith.

[Further particulars of Agricultural and Horticultural Institutions in the West Indies would be gladly received for this list. Also fixtures for Agricultural Shows for 1902.]

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is desirable that inquiry be made, beforehand, as to the terms on which such produce will be received, and whether the market is favourable or not.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—
B. S. Bayley, Water Street Georgetown.

TRINIDAD—
J. Russell Murray, Port-of-Spain.

BARBADOS—
T. S. Garraway & Co., Bridgetown.

ST. LUCIA—
Captain H. Henville, Contractor and Agent, Castries.

MARKET REPORTS.

London,—April 29, 1902.—Messrs. J. Hales Caird & Co.,

Bees-wax—Jamaica, £7. 15. 0. to £8. 2. 6. per cwt.
Cacao—Demerara, fine, 63/- to 64/-
Dominica, ordinary to good 51/- to 56 6.
Grenada, common to fine 52/- to 60/-.
Jamaica, ordinary to fair 50/- to 53/-
Trinidad, weathered to fine 50/- to 68/- per cwt.
Coffee—Jamaica, ordinary mixed and broken, 27/6. to 29/6, good ordinary 31/- to 36/-, fine ordinary to middling 43/- to 62/-, bold 75/6 to 82/-, Peaberry 48/- to 60/- per cwt.
Costa Rica, mixed to bold 39/6 to 91/6; peaberry 65/6 to 95/6 per cwt.
Ginger—Jamaica, common to good middling 34/- to 45/- per cwt. Fair to good bright 47/- to 57/- per cwt.
Honey—Jamaica, in packages 13/- to 19/6 per cwt.
Oil of Limes—Dominica 1/5 to 1/6 per lb.
Pimento—2⅞*d.* to 3*d.* per lb.
Sarsaparilla—Jamaica, native, common to good red, 5*d* to 1/-, inferior to fair 1/2 to 1/4 per lb.
Sugar—West India Crystals, 14/- to 15/6 per cwt. duty paid.
Molasses—nothing doing.
Tamarinds—12/6 to 16/- per cwt.
Logwood—(no quotation). Market quiet.
Fustic—(no quotation). In more demand, but very little offered.

New York,—May 2, 1902.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaicas, 9 hands $1.00 to $1.10, 8 hands 75c. to 80c., 7 hands 40c. to 45c. per bunch.
Cacao—African 12¾c. to 13c. Caracas, good ordinary 14¼c. to 15c.
Grenada 12⅞c. Jamaica 11c. to 11¾c.
Trinidad 13c. to 14c. per lb.
Cocoa-nuts—Jamaicas, $19.00 to $20.00 per M. Small Trinidads $12.00 to $13.00 per M.
Coffee—Good ordinary, Rio, 5⅜c. to 5½c., and Jamaica, ordinary 5¾c. to 6c. per lb., good ordinary 6½c. to 6¾c. Manchesters 8½c. to 10½c.
Ginger—7¾c. to 8¾c per lb.
Pimento—6½c. to 6¾c. per lb.
Rubber—Nicaragua Scrap 51c. to 52c. per lb, sheet 48c. to 49c. Guayaquil Strip 48c. to 49c. per lb.
Sugar—Muscovado, 89° 2 1/16c. to 3c. Centrifugals 96° 3½c.

INTER-COLONIAL MARKETS.

Antigua,—May 7, 1902. Messrs. G. W. Bennett, Bryson & Co., Ltd.

Molasses—8c. per gallon package included.
Sugar—Muscovado $1.25 to $1.27½ per 100lb.

Barbados,—May 10, 1902. Messrs. T. S. Garraway & Co.

Arrowroot—good quality, $2.75 per cwt.
Cacao—$12.35 per 100lb.
Coffee—Jamaica and Rio $9.50 and $10.25 per 100lb. respectively.
Hay—$1.70 per 100lb.
Molasses—7½c. per gallon and $4.00 for package.
Onions—$4.75 to $5.00 per 100lb. Wanted.
Potatos—Nova Scotia $1.80 to $2.00. Bermudas $4.00 per barrel.
Rice—Ballam $5.00 per bag. Patna $3.75. Rangoon $3.00
Sugar—Muscovado, in hogsheads,—$1.15 per 100lb. and $5.00 for hogshead.

British Guiana,—May 8, 1902. Messrs. Weiting & Richter.

Arrowroot—$6.50 per barrel.
Cacao—11c. to 12c. per lb.
Cassava Starch—$5.00 per barrel
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica 12c. to 13c. per lb. (retail.)
Eddoes—$1.44 per 100lb.
Onions—Lisbon (retail) strung 4c., loose 3c per lb.
Pea Nuts—American (retail) 4½c. to 5c. per lb.
Plantains—16c. to 32c. per bunch.
Potatos English—$2.50 to $2.75 per barrel.
Rice—Ballam $4.90, Patna $5.65, Seeta $5.75 per bag.
—Creole Rice 20c. per gallon, retail.
Sweet Potatos—Barbados $1.20 per 100lb.
Tannias—$1.20 per 100lb.
Yams—Barbados, $1.80 per 100lb.
Molasses—First Yellow 16c. per gallon including package.
Sugar—Dark Crystals 96° $1.61 to $1.71 per 100lb. Yellow Crystals $2.15 to $2.30 per 100lb. White Sugars, $3.50
Timber—Greenheart 32c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00. per M.

Trinidad,—May 8, 1902. Messrs. Edgar Tripp & Co.

Cacao—$13.00 to $13.50 per cwt.
Hay—(nothing doing).
Onions—$1.50 to $1.55 per 100lb. Heavy supply—weak.
Potatos English—$1.50 to $1.55 per 100lb. Supply ample.
Rice—Ballam $4.65. Seeta $5.90 per bag.
Molasses—No demand whatever.
Sugar—(no quotation).

A common parasitic fungus. That plants are often killed and damaged by fungoid diseases is well known. The cause of these diseases, namely, parasitic fungi, are however, not so well understood principally on account of their minute size. A good example of one of these fungi can be seen in almost every garden in the West Indies. The leaves of the common cannas are frequently attacked by a 'rust fungus' which is visible as yellow powdery spots on the underside of the leaves. These yellow spots are composed of the spores or seeds of the fungus by which it is able to spread and infect other plants.

Publications on sale of the Imperial Department of Agriculture

FOR THE WEST INDIES.

The 'WEST INDIAN BULLETIN.' A Quarterly Scientific Journal.

VOLUME I contains full reports of the West Indian Agricultural Conferences of 1899 and 1900; also papers on Moth-borer, Sugar-cane experiments, Agricultural education, Cacao diseases, etc.

As only a very limited number of copies of this Volume are now available, the parts can no longer be sold separately. Volume I complete, in the original paper covers as issued, post free, 5*s*.

VOLUME II contains the report of the Conference of 1901, with the President's Address, papers on the Sugar Industry, General and Educational subjects in full. Amongst the topics treated of are Recent Experiments with Sugar-cane, Sugar-cane diseases, Rubber planting in the West Indies, West Indian Fisheries, Cacao diseases, Rice, Sweet potatos, Citrate of Lime, etc. The Volume is illustrated by two coloured plates and other illustrations.

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VOLUME III. Number 1. Agricultural Conference of 1902; President's Address, Minutes of the proceedings and papers relating to the Sugar Industry and Agricultural Boards, and the Report of the Chemical Section.

Price 6d. Post free. 8*d*.

Number 2. Conference of 1902 (continued). Educational and General Papers. (In the press).

PAMPHLET SERIES.

The Pamphlets are written in a simple and popular manner and the information contained in them is especially adapted to West Indian conditions. They contain amongst other subjects, summaries of the results of the experiment work on sugar-cane and manures, the full official reports of which have only a limited circulation. The following list gives particulars of all the pamphlets which are still available. The missing numbers are out of print and can no longer be supplied :—

(3.) Seedling and other Canes at Barbados 1900. Price 2*d*. Post free 2½*d*.
(5.) General Treatment of Insect Pests, 2nd Edition Revised. Price 4*d*. Post free 4½*d*.
(6.) Recipes for cooking Sweet Potatos. Price 2*d*. Post free 2½*d*.
(7.) Scale Insects of the Lesser Antilles. Price 4*d*. Post free 5*d*.
(8.) Cultivation of Vegetables in Barbados. Price 2*d*. Post free 2½*d*.
(9.) Bee-keeping in the West Indies. Price 4*d*. Post free 5*d*.
(10.) Manures and Leguminous Plants at Barbados, 1898-1901. Price 4*d*. Post free 5*d*.
(11.) Hints for School Gardens. Price 2*d*. Post free 2½*d*.
(12.) Seedling and other Canes in the Leeward Islands, 1900-1901. Price 2*d*. Post free 2½*d*.
(13.) Seedling and other Canes at Barbados, in 1901. Price 4*d*. Post free 5*d*.
(14.) Screw worm in Cattle at St. Lucia. Price 2*d*. Post free 2½*d*.
(15.) Plain Talk to Small Owners. Price 2*d*. Post free 2½*d*.

'NATURE TEACHING.'

A text book based upon the general principles of Agriculture for the use of schools, prepared by the Honourable Francis Watts and others. (Pages XII and 199) The Plant, the Soil, Plant food and Manures, Weeds, and Insects are successively treated, and the information given is illustrated throughout by simple experiments which can readily be carried out in an ordinary school. The Book is mainly intended for the use of Teachers. Price, limp cloth 2*s*., or in a superior style of binding 2*s*. 6*d*. Postage, in either binding, 3½*d* extra.

The 'AGRICULTURAL NEWS' A Fortnightly Review.

The **'Agricultural News'** will contain extracts from official correspondence and from progress and other reports; notes on interesting points connected with the work carried on at the Government Laboratories, Botanic Stations, Experiment Stations, Agricultural Schools, Experiment plots, School plots, Agricultural shows, Lectures to teachers, etc., the occurrence of disease, the arrival of new plants and animals, the flowering and fruiting of plants of special note, the appointment, promotion and removal of officers, the weather, and, in fact, any information indicating what is going on in each Colony and the progress made in Agricultural matters throughout the West Indies.

The **'Agricultural News'** will be printed in time to be distributed, regularly, by each mail, and will be on sale by the local agents of the Department at one penny per number, post free 1½*d*. The subscription price, including postage, is 1*s*. 7½*d*. per half-year, or 3*s*. 3*d*. per annum. The work of distribution is intended to be carried on mainly by the local agents or through the post.

Agents.

The following have been appointed agents for the sale of the publications of the Department:

London: Messrs. DULAU & Co., 37, Soho Square, W. *Barbados*: Messrs. BOWEN & SONS, Bridgetown. *Jamaica*: THE EDUCATIONAL SUPPLY COMPANY, 16 King St., Kingston. *British Guiana*: The 'Daily Chronicle' Office, Georgetown. *Trinidad*: Messrs. MUNRO, & Co., Frederick St., Port-of-Spain. *Tobago*: Mr. C. L. PLAGEMANN, Scarborough. *Grenada*: Messrs. F. MARRAST & Co., 'The Stores,' St. George. *St Vincent*: Mr. W. C. D. PROUDFOOT, Kingstown. *St. Lucia*: Mr. R. G. MCHUGH, Castries. *Dominica*: Messrs. C. F. DUVERNEY & Co., Market St. Roseau. *Montserrat*: Mr. W. LLEWELLYN WALL, Plymouth. *Antigua*: Mr. F. FORREST, St. John's. *St. Kitts*: Messrs., S. L. Horsford & Co., Basseterre.

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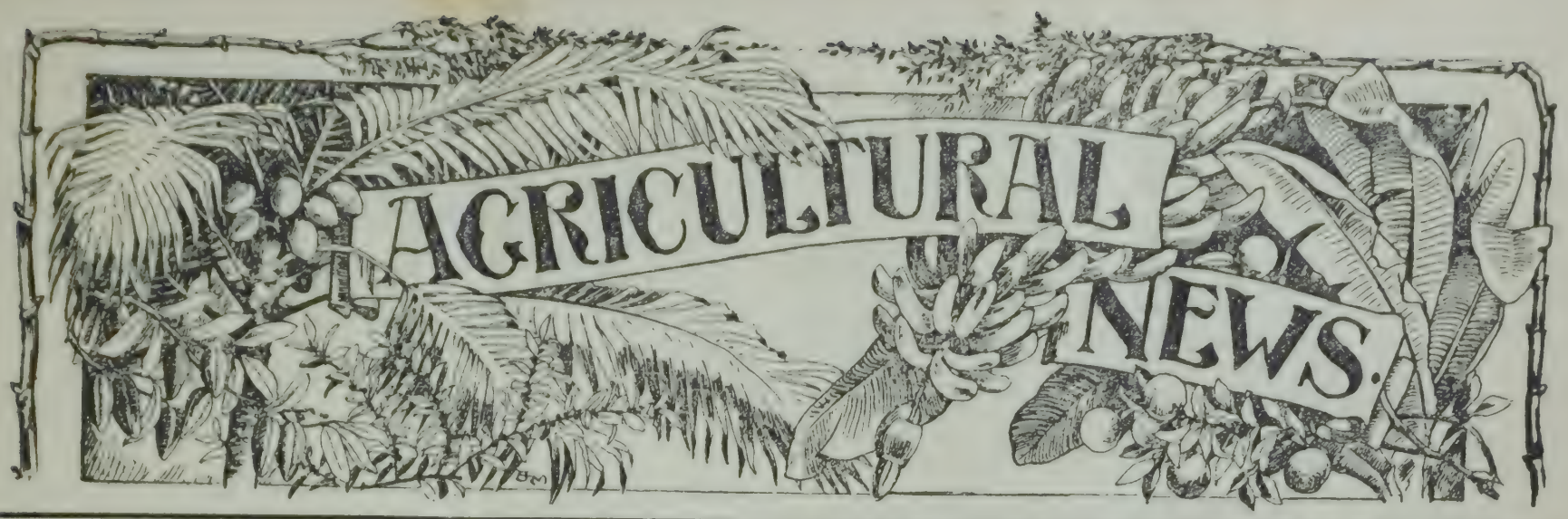

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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ARBOR DAY.

AS far as we are aware an Arbor Day Movement has not yet taken firm root in the West Indies. The subject (which is discussed elsewhere in these pages) has, on several occasions, been suggested in the press and spasmodic efforts have been made by a few. We recur to it because we believe that the proclamation of an Arbor day and the systematic planting of ornamental and shade trees under suitable auspices would greatly tend to advance the social and public interests of these Colonies.

The movement would be beneficial in many ways. It would instil into the minds of the rising generation the almost sacred duty of trying to leave the world a little better than they find it ; it would familiarize them with the needs and requirements of plant life and infuse a spirit of regard and affection for trees and check the almost universal desire, now existing, to cut down and destroy, rather than cherish, what might become useful and ornamental. In this matter of cutting down and destroying trees it has been remarked that many people 'hold the cent so close to their eye as to obscure the dollar beyond.'

The systematic care and attention to detail called forth by the planting and nurture of even one tree and watching its growth and development could not fail to have a formative effect on character. It would, further, have a high educative value in cultivating the love of Nature and the observation and interpretation of her wonderful laws.

There are, also, to be considered the advantages to the general community arising from the beneficial influences of trees in affording delightful shade, in softening the torrid heat of the sun, and in providing fuel and in bringing forth abundant fruit for man's enjoyment.

The subject is not new. It may, nevertheless, require mention many times repeated. The quaint, but fervid, appeal of Gerharde, in 1633, is as applicable to-day as it was 269 years ago:

'Forward in the name of God! graffe, set, plant and nourish up trees in every corner of your grounds; the labour is small, the cost is nothing, the commoditie is great, yourselves shall have plenty, the poore shall have somewhat in time of want to relieve their necessitie, and God shall reward your good minds and diligence.'

SUGAR INDUSTRY.

Collecting eggs of Moth-borer.

In the *Agricultural News* (pp. 3-4) attention was drawn to the importance of collecting the eggs of the moth-borer at Barbados and elsewhere at the end of the present crop when all the old canes have been reaped and thus save the young canes (the only ones now remaining) from serious injury by this pest.

In some instances planters have expressed themselves unable to collect borer eggs owing to the extent of canes under cultivation. As on most estates in the sugar islands there are only about 100 to 150, or at the most 200 acres actually in young canes, such a difficulty should not really exist, and especially as we find that on estates where a thousand or more acres are under cultivation, collecting eggs of the moth-borer has been undertaken with energy and success.

The following extract is taken from an interesting letter lately received from Mr. John M. Fleming, Manager of Diamond Plantation, Demerara, one of the largest sugar properties in this part of the world.

Mr. Fleming writes:

After reading in one of the Bulletins of the Imperial Department of Agriculture an account of the life history of the moth-borer, I commenced to collect the eggs, in addition to cutting out the cane shoots affected by the grub, which had previously been our only means of combating this pest. The small coolie children employed for the work, with their sharp eyes, rapidly became experts in detecting the eggs on the cane leaves, and large numbers have been destroyed. Eggs that are already hatched, or that are affected by parasites, are left untouched, and only the fresh ones collected.

It is impossible to say to what extent this work has been effective in diminishing the numbers of the borers; but, whether due to this or to natural causes, they are not so plentiful of late, as I have observed them in former seasons. I am satisfied that in attacking the borer in the egg stage, we are adopting the best means of mitigating the nuisance. More than this we can hardly hope to effect in this Colony, with a reaping season extending over nine months of the year, and canes in all stages of growth.

An interesting Method of applying Nitrate of Soda to canes.

In a letter published in the February number of the *Hawaiian Planters' Monthly*, an account is given of an ingenious method of applying nitrate of soda to irrigated cane land. Irrigation in sugar-cane cultivation is being tried on a limited scale in Barbados, and in the event of its future extension the method of distributing soluble manures outlined below might be of practical value.

The method consists in applying nitrate of soda by dissolving it in the irrigation water, and has been adopted by Mr. Pogue, manager of the Kihei plantation, who gives the following description of the process:

'Dissolve a bag of nitrate of soda in 50 gallons of water: pour one pailful of this solution and four pailsful of water into a barrel, which discharges by a rubber pipe into a tube filled to a given mark from which the mixture flows in an even stream into the main irrigation ditch. In this way one man can easily apply 100lb per acre of nitrate to 60 acres in 6 days.' The idea of dissolving the nitrate was suggested by the scarcity of labour. There is further the added advantage of applying this soluble manure in very small quantities, at short intervals, rather than in one or two large doses. The objection to the method is the loss by soakage in the canals through which the water passes, but in all probability this is small compared with the advantages mentioned above. Perhaps other soluble fertilizers may be applied in this manner where irrigation is practised.

CARE OF MILCH COWS.

The following plea in favour of kind and considerate treatment for milch cows is taken from the *Agricultural Journal*, Cape of Good Hope. In Barbados, as a rule, milch cows (which are mostly Alderney and excellent milkers) are well cared for; but even here, occasionally, too much energy is exerted in driving them. As suggested by Mr. Hudson in these pages it would be of great advantage if, in addition to a good supply of grass, milch cows, especially during dry weather, were encouraged by a daily pail of bran mash or pollard or some oilmeal to keep up their milking qualities.

The extract from the Cape *Agricultural Journal* is as follows:—

It often astonishes us to see the amount of energy and enthusiasm that a small coloured boy exerts in driving cows home to be milked, and the use he is allowed to make of his peculiar vernacular accompanied by a flexible sjambok. If there should be a few dogs about, it is considered good practice and training for them to round up the home-going cows. Or perhaps the cows will be entirely neglected by their drover and allowed to wend their way unguided through roads traversed by many vehicles and passengers, in and out of which the milkers have to dodge like the proverbial dog in the fair. The best bred animals in the world will become dry and useless under rough treatment. Therefore be kind and gentle to your milch cows. It is positively profitable to pet a cow as you would pet your wife or child, your cat or your canary. The least violence to a milker decreases the milk, and so does every bark of a dog and every yelp of a larky boy, not to mention the sjambok. Gentle methods prevail on a well-kept and successful dairy farm The cow

knows exactly what she has to do, and her goings to and fro, her down-squattings and her up-risings will, of her own volition, be as regular as the rising and setting of things terrestrial—all her master or her mistress has to do is to wait upon her and treat her as a valuable member of the family Let her feed while you milk her; even from this habit you will gain increased milk through the anticipation which the animal enjoys of the combined delights of a nice little nibble and the attentions of the milkmaid.

EXPERIMENT PLOTS.

In addition to the Botanic Stations and other Agricultural Institutions in the Windward and Leeward Islands and Tobago, and the Sugar Experiment Stations at British Guiana, Barbados, Antigua and St. Kitts-Nevis, special efforts were started by the Imperial Department of Agriculture in 1900-1901 to improve the cultivation of cacao, limes, pine-apples, and other crops in Colonies suited for them. The existing institutions, above referred to, had already acted as centres for the propagation and distribution of economic plants, and as training schools for the practical teaching of tropical agriculture. It was, however, recognized, that a more direct influence was required to be brought to bear on the large body of peasant cultivators in these islands, who from their isolated position are often out of touch with the work carried on at Botanic Centres. This was sought by the appointment of travelling Agricultural Instructors and by affording practical object lessons by means of sub-stations or experimental plots established in the country districts of Grenada, St. Lucia and Dominica. The main features of these plots are as follows:—A small area of cacao, of about one acre in extent, is selected on a portion of a large estate, in a conspicuous situation, and bordering on a public road. With the consent of the proprietor it is placed at the disposal of the Department of Agriculture for experiment purposes for a certain term, usually three years. Preference is given to districts where the trees are old and unhealthy, and where the soil is typical of the poorer lands in such localities. The selected plot is taken in hand with the view of illustrating the best and most economical methods of reclaiming and improving it. If necessary, the land is forked and drained and the trees pruned and manured. These operations usually occupy some time and are carried on under the personal supervision of the Agricultural Instructor who furnishes monthly reports of the work done. The cost of tillage and all manurial and other treatment is borne from the Agricultural grant-in-aid, and careful records are kept of expenditure and results obtained. Each plot is conspicuously labelled and is usually divided into four sections for manurial experiments. Each section has also a label stating the kind of manure used, the quantity per tree and the date of application. So far, the results attained are satisfactory and encouraging. On some of the cacao experiment plots, the trees, even after one year's treatment have yielded excellent results as compared with other portions of the same fields. It is hoped that simple object lessons of this character will prove of value in impressing cacao proprietors, large and small, that even old and apparently valueless trees may be reclaimed and brought into bearing, with proper care and attention, and at a cost that will leave a fair margin of profit. It is gratifying to learn that peasant proprietors, for whose benefit these experiments are chiefly carried on take a deep interest in these plots, and in many cases have adopted similar operations on their own lands. The Imperial Commissioner of Agriculture and the Travelling Superintendent regularly visit and inspect these plots.

GRENADA.

At Grenada, the importance of experiment plots as a means of benefiting the Agricultural classes was, at once, recognized by his Excellency Sir Alfred Moloney, K.C.M.G., the Governor-in-Chief of the Windward Islands. In an address to the members of the Grenada Agricultural Society in 1899 he warmly supported the scheme:

'It was proposed,' he said, 'to establish model patch gardens or experiment plots as object lessons in the different parishes and districts. . . . . In order to be in a position to carry such a project into effect the Imperial Department of Agriculture would be ready to take charge of, say, an acre of cacao in each parish placed for the purpose at its disposal by the proprietors. Also that expert advice and control would be devoted to each plot so as to ensure maximum crops. It was unnecessary to enlarge on the benefits to every section of the agricultural community that must accrue from the establishment of such model gardens or experiment plots, if established in suitable situations and easy of access to the agricultural population.'

In the early part of 1900 seven plots of cacao, varying in size from 1 acre to $1\frac{3}{4}$ acres were selected by the Travelling Superintendent and the Curator of the Botanic Station. The Grenada plots are situated at Vendôme, Gouyave and Chantimelle estates on the leeward side, and at the Nianganfoix, Colombier, Belle Vue and Windsor Forest estates, on the eastern side of the island. The soil in nearly every case is a red clay, deficient in phosphates, potash and available lime. The plots are each divided into four sections, and the manurial treatment consists chiefly of experiments with pen manure and basic slag followed by applications of either nitrate of soda, sulphate of ammonia, or sulphate of potash with the view of ascertaining the relative value of these manures.

ST. LUCIA.

In this Colony five cacao experiment plots were selected during 1900-1901, at La Perle, Anse-la-Raye, Roseau, Cul-de-sac and Beausejour estates. Manurial and other cultural operations are conducted on the same lines as at Grenada. In addition to the cacao plots an area of 5 acres at Rivière Dorée estate on the southwest side of the island has been laid out and planted with cotton, limes, pine-apples and other crops. Owing to the absence of trees, this part of St. Lucia suffers at times from both wind and drought, and is therefore unsuitable for the cultivation of cacao or any product requiring a sheltered and damp situation. The efforts of the Department at the Rivière Dorée plot are undertaken with the view of encouraging land owners in this locality to take up the cultivation of more hardy crops and to utilize land which is now of little or no value.

DOMINICA.

At Dominica, as early as 1899, the question of establishing experiment plots had received attention. In June of that year the Travelling Superintendent and the Curator of the Botanic Station made a tour of the southern end of the island for the purpose of selecting these areas. Considerable difficulty was experienced in obtaining land in suitable situations, and for this reason operations were not commenced until 1901. During that year eight cacao plots were selected in the out-parishes of the island and manurial experiments commenced on similar lines to those at Grenada and St. Lucia. The plots chosen are situated at Geneva, Point Mulâtre and Carse of Gowrie estates on the windward side, at Clarke Hall, Moor Park, Picard and Blenheim estates on the leeward side, and at Riversdale estate near the new Imperial road leading to the interior of the island. In view of the

extension of the lime industry in Dominica, an experiment plot of limes was started under the direction of the Hon'ble Francis Watts at Hampstead estate. The plot is divided into nine sections, and experiments are being conducted with the object of ascertaining the effect of various kinds of manurial substances on the lime cultivation.

CULTIVATION OF PARA RUBBER.

A brief account of the conditions under which trees yielding Para rubber flourish in their native country was published in the *Agricultural News* (pp. 36-37). It is desirable to add to that account a few additional facts that have recently been placed on record.

It was formerly thought that the Para rubber tree *(Hevea brasiliensis)* could only thrive in swampy land, or at any rate on land subjected to periodical inundations. This question was discussed by Mr. J. H. Hart in his paper on 'Rubber planting in the West Indies' at the Agricultural Conference of 1901 *(West Indian Bulletin,* Vol. II., p. 104). Mr. Hart pointed out that in Ceylon it has been found that the trees do best in good alluvial soil on fairly flat land, at about sea-level, and that in Trinidad they are 'even growing on a dry gravelly soil.' The manner in which the erroneous idea about their requiring swampy land came to be circulated is explained in a recent article by Mr. H. A. Wickham, who in 1876-7 served as a special commissioner and collected for the Indian Government some 7,000 plants from which the whole of the present stock of Para rubber plants in the East have probably been raised. The following extract is taken from *The India-Rubber and Gutta-Percha Trade's Journal* for January 20, 1902.

'As all the stock of plants or seed available for the planting and cultivation of this tree in the Eastern tropics are and will be derived from direct lineal descendants of some or other of those 7,000 odd originally introduced by me at the instance of the Government of India in 1876-7, it may be well if it be recollected that their exact place of origin was in three degrees of south latitude, and to remember their natural conditions there. This, the more so, since a very general error seems to have obtained that swampy or wet lands are the fitting locality for the *Hevea*. This would seem to have arisen in that the "explorer" of a few years' experience would have some of these trees pointed out to him (naturally in answer to inquiries) growing scattered along the wet margins in going up the lower Amazon or tributaries, whereas the true forests of the Para rubber tree lie back on the highlands, and those commonly seen by the inquiring traveller are but ill-grown trees which have sprung up from seeds brought down by freshets from the interior.

'As a matter of fact, the whole of the *Hevea* which I procured for the Government of India were produced on large grown trees in the forest covering the broad plateaux dividing the Tapajos from the Madeira rivers. The soil of these well drained, wide-extending, forest-covered table lands is a stiff soil not remarkably rich, but deep and uniform in character. The *Hevea* found growing in these unbroken forests rival all but the largest of the trees therein, attaining to a circumference of 10 feet to 12 feet in the bole. These forest plains having all the character of widespread table lands occupy the space betwixt the great arterial river systems of the Amazon, and present an escarped face, which follows, at greater or less distance, and abuts steeply on, the igapo or vagas,—i.e., the marginal river plains—subject to inundation by the annual rise of the great river. So thorough is the drainage of this highland that the people who annually penetrate into these forests for the season's working of the rubber have to utilize certain lianas (water-bearing vines) for their water supply, since none is to be obtained by surface well sinking, in spite of the heavy rainfall during great part of the year.'

In Burma an experiment is in course of progress, under the superintendence of Major J. A. Wyllie, I.S.C., F.R.G.S., to determine the possibility of growing Para rubber on a sewage farm. The *Indian Rubber World* for April 1, 1902 says:—

'The municipal duties of Major Wyllie comprise (among other things) the management of public gardens and the disposal of public refuse in Rangoon. In these gardens for several years past Major Wyllie has been carrying out experiments in rubber growing, one result of which, at the close of 1898, was a stock of Para and Ceara rubber seedlings out of proportion to the space available in the gardens. At the same time, objection had been made to the disposal of sewage in a region devoted to market gardening, whereupon Major Wyllie secured 32 acres of ground convenient to Rangoon, which was laid out as a sewage farm, and to which the rubber seedlings were transplanted. "The young Heveas seem capable of absorbing any amount of manure and the farm itself is of great use in the opportunities it gives of observing the behaviour and requirements of the Para rubber tree during the period of acclimatization."

'On the whole,' writes Major Wyllie, after detailing the experimental work done on his rubber sewage farm, 'the culture of rubber in Burma may be looked upon, if not as the coming industry, at least as one of the industries bound to come. It may be objected that, if such minute attention to detail is required for the establishment of a rubber forest, rubber cannot be the wonderfully profitable crop it has been asserted to be. But this is a mistake. The more carefully minor points are observed and results noted in the first beginnings of the undertaking, the sooner will the needful lessons be learned, and learned once for all. . . . . .'

The sewage farm is known as the Kambe plantation. It comprised, on July 10, 1901, the following number of rubber plants, besides which a large number of seeds had lately been placed in the ground: Para, 2,732; Ceara, 293; other species 62; total, 3,087.

The article has two illustrations showing the entrance to the Indian rubber and Sewage farm, and a portion planted out with Para rubber seedlings.

Precocious Germination in a Melon. The germination of seeds while still attached to the parent plant (as is the case in some of the mangroves) is not common in the plant world. An interesting case of precocious germination in melons is described by Sir W. T. Thistleton-Dyer, in the *Annals of Botany* for March 1902. A melon on being cut open was found to contain a large number of seedling melons which had developed from the seeds and grown at the expense of the sugary juice of the fruit. Some of them weighed twenty times more than the seeds from which they grew. Examples such as this are of considerable scientific interest, and it is hoped that an account of any such cases met with in the West Indies will be contributed to these columns.

TOBACCO CULTIVATION.

JAMAICA.

The following extracts affording useful hints respecting sowing the seed and planting out seedlings of tobacco are taken from a recent paper by Mr. T. J. Harris, Superintendent of the Experiment Station at Hope Gardens. The paper, in full, appears in the *Bulletin of the Botanical Department, Jamaica*, for April, 1902, pp. 49-52 :—

Sowing Seed.

Time of sowing.—The best time to sow is about the middle of August ; the seedlings would then be ready for planting out during October. After this main sowing it is, however, very necessary to sow a few beds every fortnight for the purpose of keeping up a supply of plants in the event of unfavourable circumstances occurring later on.

Sowing.—Mix the seeds with twice their bulk of fine sand or wood ashes and scatter evenly over the bed (including the long sloping sides) when the air is still. Water with a fine rose watering can, and keep the bed moist until the seedlings are ready for hardening off.

Hardening off.—Four weeks after germination the seedlings will begin to pack together, covering the soil. They should now be gradually hardened off by keeping them moderately dry, watering them only when there is danger of the leaves drooping. In seven weeks from sowing they should be ready for planting out.

Planting.

Time for planting.—There is a certain short period towards the end of the year in which tobacco plants, whether in the beds or in the field, grow and develop at an exceedingly rapid rate. This is usually from the last week in October to the middle of December. The success of a crop depends very largely on whether the main lot of plants are set out before this period or not ; if not, then the plants will not be fully developed by the time the dry ripening weather comes on. An important point is to make the best possible use of the latter half of the October 'seasons' with a view to growing large plants and leaves that will be ready for the dry weather when it arrives.

Planting.—The seedlings are ready for planting out when they have three or four leaves about four inches long and a hard stem from two to three inches long. Care should be taken when lifting them from the beds not to break off the tap root as such seedlings often result in curly-leaved plants. The best time of the day for planting is usually from three o'clock in the afternoon until dark.

Two days before planting is to be commenced the nursery beds should receive a thorough soaking with water ; the plants can then be got out without damaging the roots. Planting boxes, each capable of holding about 1,000 plants, should be prepared beforehand. These may be made out of any light wood, the most convenient shape being that of a square coal-scuttle or sugar scoop ; 15 inches by 2 feet 3 inches on the longest side. The seedlings are stacked in these boxes just as they come from the bed and are not disturbed until they are planted in the field. Each planter should have a box, and there should be several spare ones so that the planters may be kept supplied with newly-filled boxes from the nursery as the others get empty. The idea is to prevent the roots being exposed or dried or damaged in any way.

In the actual planting great care should be exercised in organizing the work in such a way as to prevent a hitch occurring causing loss of time. After repeated trials of various methods I have found the following to be the best and quickest :—procure eight stout pegs and two rough mallets ; put four pegs into the ground on each side of the field at a distance of three feet apart and stretch lines between the first two pairs ; start one man with a six-pointed dibbler from each end to make the holes, with one man following to fill the holes with water as they are made. Water should be applied *whether the soil be moist or dry.* Three planters may follow each waterer.

Care should be taken to see that the roots are placed well into the mud formed by adding the water. To secure this thrust two fingers into the centre of the small puddle and draw half on one side ; insert the roots, then press the moved half back again to the plant and smooth down the surrounding soil. No watering should be required after this.

Experiments with Tobacco at St. Kitts.

The Hon'ble Francis Watts contributes the following notes on preliminary efforts to grow tobacco at St. Kitts :—

A good deal of interest was being taken in the subject of tobacco. As you have been already informed, I have for nearly three years had in view the advantages afforded by the St. Kitts' soils for producing high-class cigar tobacco, and have endeavoured to arrange for systematic experiments. At present there are several small lots of tobacco being cured, notably those at the Botanic Station and that belonging to Mr. Adamson at Brighton. I was able to give a certain amount of attention to these during my stay, and to assist Mr. Lunt, who is taking a keen interest in this work and its development. I do not anticipate that the experimenters will produce a high grade of tobacco in their early experiments : they are however gaining a great deal of experience which will enable them to proceed with much greater confidence and with much greater chance of success in future trials. These experiments should be carried on, at the Botanic Station at least, on a larger scale next season, and a suitable curing house should be erected.

COCOA-NUT BUTTER.

The *Journal* of the Royal Horticultural Society for April contains this note on an article, by Mr. J. R. Jackson, which appeared in the *Gardeners' Chronicle* for December 1901 :—

This substance has lately attracted a good deal of attention ; its manufacture in this country [England] and on the Continent is now very considerable. It is manufactured from the kernels of cocoa-nuts, and is used as a substitute for butter or lard in cooking. It is sold in Germany at about 8*d.* per lb. It is claimed that it contains more than 90 per cent. of vegetable fat, and that it is more wholesome and easier digested than the ordinary fat used for baking and cooking. It is said to be much in demand amongst vegetarians, Jews, and Mahommedans. In English trade it is known as '*Nucoline.*'—

We might add that cocoa-nut suet also figures in the English market under the name of '*Vejsu.*'

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the Imperial Commissioner of Agriculture, Head Office : Barbados. It is particularly desired that no letters be addressed to any member of the staff by name. Such a course will entail delay in dealing with them.

Communications should always be written on one side only of the paper. It should be understood that no contributions or specimens will, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Local Agents and not to the Head Office. Where no Agents exist subscriptions at the rate of 3*s*. 3*d* per annum, payable beforehand, will be received at the Head Office.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News.

Vol. I. SATURDAY, JUNE 7, 1902. No. 4.

NOTES AND COMMENTS.

Scientific Commission for St. Vincent.

The following telegram was received from the Colonial Office on May 30. The Under-Secretary of State for the Colonies to the Imperial Commissioner of Agriculture for the West Indies :—

'Scientific Commission consisting of Doctors Fleet and Anderson appointed by the Royal Society to investigate volcanic disturbances leave for St. Vincent by to-morrow's mail (May 28.) Should be glad if you could meet them at Barbados.'

Jamaica and Barbados Mahogany.

It has been shown by Mr. Hart at Trinidad that the mahogany trees so commonly grown at Jamaica, Barbados and elsewhere in the West Indies are somewhat different from the mahogany trees of British Honduras. The latter are said to be stronger-growing, while the leaves are larger and of a different shape. The Honduras mahogany is also said to yield timber lighter in colour and more easily worked than the ordinary West Indian mahogany.

New Milk Standard.

It may be useful to place on record in these pages the new milk standard adopted by the English Board of Agriculture. This came into force in September 1901. It requires that when a sample of milk (not being sold as skimmed or separated, or condensed milk) contains less than 3 per cent. of milk-fat or 8·5 per cent. of milk-solids, other than milk-fat, it will be presumed, for the purposes of the Sale of Food and Drugs Act, 1895 to 1899, until the contrary is proved, that the milk is not genuine. When a sample of skimmed or separated milk (not being condensed milk) contains less than 9 per cent. of milk solids, it will be regarded as not genuine.

Budding Oranges.

The practice of budding oranges is becoming a part of the regular routine at all the Botanic establishments in the West Indies. In the interesting *Bulletin* of the Botanic Gardens at Trinidad, January 1902, Mr. Hart writes :—

Some advance has been made in the propagation of the imported kinds of oranges during the present year, and a fairly good stock of strong budded plants is now on hand. This it is trusted will do away with the complaint, so frequently heard, of oranges proving sour when raised from seed, a case of which occurred during the present week. The stock used is that of the Seville orange which does not suffer in our climate from stem-rot or Mal-di-gomma, as do the best of our St. Michael's and Tangerine kinds, The 'Washington Navel' is among the varieties successfully budded. I learn that in some instances the pupils who attended the recent Agricultural Lectures are meeeting with fair success in budding and grafting.

Grafting Coffee, Cacao and Nutmeg.

Mr. Hart states that he has grafted (by approach) a prolific form of *stenophylla* coffee on stock of the *liberian* coffee. The union was effected with but little trouble and the plants are growing freely. In addition he has successfully grafted (also by approach) the ordinary cacao on stocks of the stronger-growing 'tiger' or wild cacao of the mainland, *Theobroma bicolor*. As already mentioned the female form of the nutmeg tree is being regularly grafted on to male stocks at Jamaica. About seventy plants were established by Mr. Fawcett in 1901.

Lagos Silk Rubber.

The tree yielding this rubber is being gradually established in the West Indies. The name *Kickxia* has now been replaced by *Funtumia*, derived from the West African name of the tree. It is noticed that the young plants, if left to themselves, are liable to form a bushy habit and thus rendered less valuable for rubber-yielding qualities. To correct this it is recommended that the trees be pruned by gradually taking off all the lower branches and that one central, clean stem be encouraged. (See also p. 39) Even when the trees are tolerably large this is still required to be done if they are to be tested, as they should be, for yield of rubber. The Central American rubber tree *(Castilloa)* and the Lagos silk rubber tree *(Funtumia)* evidently are the most promising rubber trees for cultivation in the West Indies.

Hints on Planting Corn.

The following hints quoted by the *Sugar Planter's Journal* may be of service in the West Indies:—

An experienced farmer in Oklahoma has adopted a method of planting maize or corn which will often produce a crop when hot winds have ruined the corn as previously and ordinarily planted. His plan is to go over the fields two or three weeks after the regular planting is done and plant new hills fifteen rows apart each way. If the weather becomes dry, or hot winds blow at the critical season, and the tassels of the corn are killed before there has been time for the silk on the ears to become fertilized, the corn that is planted later will develop tassels in time to furnish the necessary fertilizing pollen, and a crop will thus be often produced when no grain whatever could be raised without the late planting. He claims to have tried this method and to have succeeded in raising a crop when his neighbors have failed. He has another method, which is to soak seed corn in kerosene a short time before planting. This not only quickens the germination and growth of the grain, but it is claimed to be a safeguard against birds, gophers and insects that usually attack the seed.

A Record Banana Export.

The Jamaica *Gleaner* reports that the exportation of bananas for the year ending March last is likely to amount to a total of over ten millions of bunches, a record for Jamaica. The returns are compiled according to the computation of the companies, so that two small bunches are counted as one bunch. The total number of actual bunches therefore greatly exceeds ten millions. The prospects for the spring crop of bananas are excellent, and there is likely to be a great deal more competition between the companies along the northern side this year than is usual. During the financial year, ending March 1903, this year's total will probably be largely exceeded. A well-known official, who is concerned in the compilation of the statistics, has stated that he expected the total at the end of next March would be over twelve millions of bunches.

Production and Consumption of Coffee.

The French Consul in Brazil, in a report on the state of trade in that country, states that there is an over-production of coffee throughout the world, and that in Brazil there is a tendency to restrict the area of cultivation. He says that in the year from July 1, 1900, to June 30, 1901, the total production of coffee throughout the world was 15,460,000 bags, of 132lb. each, and that of this quantity 11,500,000 bags were grown in Brazil, 1,150,000 in Guatemala, Costa Rica, Mexico, and Nicaragua, 1,050,000 in Venezuela, Colombia, Ecuador, and Peru, 480,000 in the Dutch Indies, 450,000 in Hayti, 315,000 British India and Ceylon, 200,000 in Puerto Rico and Jamaica, and 90,000 in Padang. He estimates the consumption at 14,117,620 bags, leaving an excess of production at 1,342,380 bags. *(Times).*

Arbor Day for the West Indies.

It is suggested that Coronation day, June 26, would be an appropriate one to adopt in the West Indies as an Arbor day. It would commemorate a striking event in the history of the Empire and besides it would fall exactly at the right season for planting purposes. In many localities the planting of ornamental shade trees would be of great public benefit and at the same time add to the comfort and amenities of life in the tropics. Suitable trees and palms are always obtainable for the purpose at the Botanic Gardens and it only requires the movement to be started, under favourable auspices, to be taken up with every hope of success. A few preliminary hints might be useful. The holes for the trees, about 3 feet square and about $2\frac{1}{2}$ feet deep, should be prepared some days beforehand and filled with good soil. The actual planting requires care but it is an operation that affords pleasure to many; preferably it should be undertaken in the afternoon and the plant immediately watered. If the trees are planted in open spaces or along road-sides where they are liable to be injured they should be protected by tree-guards. If desired, permanent metal labels for Coronation trees would be imported and supplied, at cost price, by the Imperial Department of Agriculture.

Nature Study Exhibition.

The interest taken in England in this subject is evidenced by the exhibition which it is proposed to hold at the Gardens of the Royal Botanic Society Regent's Park. It will be open to Colleges and Schools of every grade, and the exhibition will include all that bears upon Nature Study. To those who desire to understand exactly what Nature Study means and how it may be carried out with interest and profit to both old and young we cannot do better than commend the handbook *Nature Teaching* specially prepared for the Imperial Deparment of Agriculture by the Hon. Francis Watts and others. This is obtainable from the Agents of the Department in all parts of the West Indies.

The Manufacture of Papain.

In the course of a notice on the paper on this subject which appeared on page 4 of the *Agricultural News*, the *Montserrat Herald* says:—

This article is pretty well exported from here. There are not less than three drying stoves in the island of Mr. Watts' description, so the mode of preparation is not new to those who are engaged in its manufacture. But we do not think that it is generally known by those who sell the juice that—'It is essential that no iron knife or iron utensils should be brought into contact with the milk. Wood and bone should be employed, and the milk should be collected in earthenware basins or cups, or in glass vessels, and not in tins, which are sure to blacken it.

WEST INDIAN FISHERIES

Tarpon or Cuffum at Barbados.

The information already published in the *Agricultural News* (pp. 8 and 24) on the Tarpon and its habits, indicate that this fish is known in Barbados as the Cuffum, and found not only on the inner shoals and fishing banks of the sea, but inland in certain swamps. The swamp at Graeme Hall, for instance, contains large numbers of Cuffum amongst other varieties of fish. The heavy rainfall during the hurricane of 1898 caused the swamp to overflow and many of the larger fish are supposed to have escaped to the sea, yet Cuffum is still there. Large fish measuring from 4 to 5 feet in length have been landed from this swamp. Capture is principally effected by the use of trawling nets. Fish of similar size have, however, been captured with hooks 2 to 2½ inches long on stout line, while smaller fish have been landed with the rod. The cuffum bites readily at live bait of any description, but seems to prefer what is known locally as 'mud fish,' so named, apparently from its colour, and its habits of lying on and sometimes hiding itself beneath the mud.

As an edible fish, the cuffum is not liked by the majority of people owing to its bony nature but it always affords excellent sport.

Sparrows. The West Indies are fortunate in not having the English sparrow as part of the bird life. Other sparrows are not uncommon, and especially the little brown sparrow found near houses. These birds play a curious part in nature, in that they destroy the seeds of many weeds and grasses and so tend to check the increase of the latter. Being small, they are scarcely worth trapping or shooting and so are tamer than many other birds. It requires little to persuade them to come in-doors, a few crumbs regularly placed on a window-sill soon enticing them. As weed destroyers they deserve encouragement, and will come to yards and carriage drives in search of the weeds whose seeds form their staple fare.

The 'Blue Page' Moth. During the gale that reached Barbados and St. Vincent on August 26, 1901, numbers of a large moth were found in Barbados, of a kind not known to breed there. They had evidently been brought by the high Southwest wind. Some were caught and identified as *Urania Sloanei*, the 'blue page' of Trinidad, and they had apparently come from the mainland or, more probably, from Trinidad itself. They were found as far north as Dominica, and one was caught on the R.M.S. 'Eden' midway between St. Lucia and Barbados. This is an excellent instance of how insects spread from island to island, and had these moths found suitable conditions in Barbados, they might have become established there and formed an addition to the permanent fauna. The direct distance from Trinidad to Barbados is about 160 miles, and to Dominica is some 100 miles more.

THE VALUE OF CONDIMENTS IN STOCK FEED.

The question of the value of spices and other condimental foods such as locust bean and molasses, which are often advocated as an addition to the feeding materials given to stock, has recently been investigated by the Royal Agricultural Society of England at the Woburn Experiment Station. Sixteen short horn bullocks, divided into four lots of four bullocks each, were used for the experiment. Lot I received the ordinary or 'standard' feeding, consisting of linseed and cotton cake, maize meal, hay, chaff and roots. In Lot II, the maize meal was half replaced by locust bean meal. In Lot III, the 'standard' feeding was spiced, while in Lot IV, a little sugar-cane molasses (¼-lb per head per day) was poured over the chaff. The results are summarised in the following table :—

	Lot I (ordinary feeding).	Lot II (locust bean meal).	Lot III (spice)	Lot IV (molasses).
Total carcass weight of four bullocks.	st. lb. 384 4	st. lb. 368 1	st. lb. 361 7	st. lb. 380 7
Price realized at 4/4 ℔ stone.	£. s. d. 83. 6. 2.	£. s. d. 79. 15. 2.	£. s. d. 78. 8. 2.	£. s. d. 82. 10. 6.
Less cost of food.	29. 13. 0.	28. 2. 9.	26. 4. 0.	28. 15. 0.
Difference.	£53. 13. 2.	£51. 12. 5.	£52. 4. 2.	£53 15. 6.
Aver. gain in live weight per day.	1·95 lb	1·67 lb	1·84 lb	1·85 lb

The result of this experiment shows that no case can be made out from it for any of the virtues supposed to belong to spice and condimental foods, but that bullocks will fatten just as well and as economically on a well chosen mixture of ordinary foods. It was observed that when molasses was used, there was a tendency to 'looseness' in the animals when more than one quarter of a pound per head per day was given.

PRESERVATIVES AND COLOURING MATTER IN FOOD.

Every year large quantities of preserved foodstuffs are imported into the West Indies in which various 'preservatives' are no doubt used. As some of the substances employed to improve the keeping qualities of foods are injurious to health, a Departmental Committee was appointed by the Local Government Board in 1899 to 'inquire into the use of preservatives and colouring matters in the preservation and colouring of food, and to report (1) whether the use of such materials, or any of them, for the preservation and colouring of food, in certain quantities, is injurious to health, and, if so, in what proportions does their use become injurious; (2) to what extent, and in what amounts, are they so used at the present time?'

The Committee have now presented their Report and minutes of evidence, the whole forming a Blue-book of nearly 500 pages.

The antiseptic agents employed in the preservation of food are boric or boracic acid and borates; so-called 'boron preservatives;' sulphurous acid, and sulphites, fluorides, salicylic acid, benzoic acid or

benzoates, formalin or formaldehyde. The 'boron preservatives' are preparations of borax and boracic acid (with or without the admixture of other preservative ingredients such as salt, saltpetre, sugar, carbonate of soda, etc.,) and are generally sold in the form of a white powder under a great variety of fanciful names. They are used largely for dairy produce in margarine, ham, bacon, sausages and preserved meat foods generally.

The most commonly used colouring matter for dairy produce is annatto, the red pulp surrounding the seeds of *Bixa Orellana*. This and other yellow colouring matters of vegetable origin such as turmeric have been considered harmless in the quantities employed, but they are being superseded by coal tar yellow dyes. The action of these on the human system is not fully known.

The Committee make the following recommendations:—

(1.) That the use of formaldehyde or formalin or preparations thereof, in foods or drinks, be absolutely prohibited and that salicylic acid be not used in a greater proportion than one grain per pint in liquid food, and one grain per pound in solid food. Its presence in all cases to be declared.

(2.) That the use of any preservative or colouring matter whatever in milk offered for sale in the United Kingdom be constituted an offence under the Sale of Food and Drugs Act.

(3.) That the only preservative which it shall be lawful to use in cream be boric acid or mixtures of boric acid and borax, and in amount not exceeding 0·25 per cent. expressed as boric acid. The amount of such preservative to be notified by a label.

(4.) That the only preservative permitted to be used in butter and margarine be boric acid or mixtures of boric acid and borax, to be used in proportions not exceeding 0·5 per cent. expressed as boric acid.

(5.) That in the case of all dietetic preparations intended for the use of invalids or infants, chemical preservatives of all kinds be prohibited.

(6.) That the use of copper salts in the so-called greening of preserved foods be prohibited.

(7.) That means be provided, either by the establishment of a separate Court of Reference, or by the imposition of more direct obligation on the Local Government Board to exercise supervision over the use of preservatives and colouring matters in foods, and to prepare schedules of such as may be considered inimical to the public health.

ST. LUCIA.

Agricultural Notes.

The following agricultural notes have been received from Mr. George S. Hudson, the Agricultural Instructor at St. Lucia :—

Weather —The weather continues extremely dry, save for a thunderstorm on the 19th inst., which yielded a very welcome 20 to 30 parts of rain. From the 15th to the 20th May the whole island was enveloped in a light hazy mist, the result of Volcanic Ash suspended in the air. Traces of this ash can be seen on all foliage, it being apparently deposited more freely at night, being no doubt precipitated by the action of the dew.

All planting operations are delayed by the continuance of the drought. Pastures yield little or no food to animals, and the flowering of cacao trees is being retarded.

Cattle.—Stock owners would do well to buy a bag or two of oilmeal and bran (or pollard) during this trying season, and give each adult horned animal a drink night and morning compounded of 1lb. of each mixed with 4 gallons of water, half in the morning and half in the evening. Molasses must be added when the animals are unaccustomed to this mode of feeding, but may little by little be omitted as they get accustomed to it. This is a valuable means of maintaining a milk supply during the dry season, and in fact, during any part of the year. Cattle are very expensive just now, good milch cows fetching £8 to £10 readily.

The screw-worm does little damage at this time of the year. A certain degree of humidity seems to be necessary for its evolution from the chrysalis stage.

Agricultural Labour is scarce. Some of the sugar factories and many cacao estates are practically working half time in consequence.

Honey.—It is desirable to draw the attention of bee-keepers to the fact that comb-honey is so successfully produced that the local market is likely to be overstocked. Inquiries have been made in Jamaica, New York and London as to whether the practice of shipping comb-honey would prove safe and lucrative, and the replies which we give below tend to convince us that the production of comb-honey must be abandoned for that of extracted or liquid honey, and then, our best market would be London. Should this prove to be the case bee-keepers in the smaller islands should profit by the experience gained in Jamaica, which shows how easily a bad reputation for an island's goods may be gained by shipping inferior honey (the apparent result of excessive syrup feeding), and enclosing same in imperfectly cleaned and unattractive packages. We strongly recommend the use of cases supplied by American makers of bee-keeping supplies, containing 2 empty 5-gallon tins capable of containing 120 lb. honey, costing 75 cents each in New York, and about $1.00 each in the West Indies. By referring to the Market Report published fortnightly in this paper, it will be seen that Jamaica honey in tins sells at from 1*s* 6*d* to 3*s* per cwt. more than the same honey in barrels, and there are also savings in cost of putting up, transport and freight, when tins are used.

New York.—5th May, 1902. Messrs. Gillespie Bros. & Co., report: 'Honey in comb.—While there is generally a good demand for this, the difficulty in your case would be the risk of breakage in transport, as unless shipments receive most careful handling on the voyage from St. Lucia, we think a fair proportion of the whole would arrive broken. It is not unlikely that special arrangements might be made in case of a trial shipment from which a useful idea could be obtained for working eventual business. The duty is at the rate of 20 cents a gallon, and the Customs reckon that 12 pounds of the honey are equal to one gallon. We may mention that they refer to the honey in comb as being one pound, exclusive of the containers. So far as we can learn, a fair quotation for comb-honey to-day is 9 cents to 13 cents per pound.'

London.—15th April, 1902. Messrs. Ross & Norton report: 'Honey—We are advised that comb-honey does not prove satisfactory, and that you had better ship in the liquid form. On present prices this would realize 15*s* to 22*s* cwt. according to condition and quality.'

Jamaica.—6th May, 1902. No one here ships comb, only honey in cask or tin, but the quality varies very much.'

ONION CULTIVATION.

Dominica.

In the *Agricultural News* of May 10 (p. 20) information was published respecting the considerable trade in onions carried on between Cuba and the United States. In spite of the advantages undoubtedly possessed by Cuba, those who are concerned in onion cultivation in the West Indies need not be discouraged thereby, provided their produce is exactly suited to the New York market and is packed in suitable crates. The following is a letter, dated May 10, addressed by the Hon'ble H. Hesketh Bell to the Editor of the *Dominican*:—

The results of the experimental shipments of Dominica onions which we made to the New York market in February and March last will probably be of interest to your readers and may, I hope, encourage further ventures in that direction.

(2.) 12 crates were shipped on the 28th February and 5 on the 11th. March. Both lots reached New York in excellent condition. The first realized $2.50 per crate, and the second $2.40. The brokers reported that the quality of our onions was so good that they could 'at all times compete with Bermudas or Cubas.' They warned us, however, against making small shipments as the charges on such small lots eat up a disproportionate part of the proceeds.

(3.) The onions sent on these occasions were produced at the Agricultural School, at the Botanic Station, and by Mr. E. A. Agar at 'Lahaut.' Those I grew at 'Sylvania' were equally fine and were sent to Barbados and St. Lucia, where they sold at remunerative rates. I learn that some of the experiments made by planters in other parts of the island were unsuccessful, this year, owing to the attacks of a kind of slug known as the 'paloot.' I trust that those gentlemen will not be discouraged, and that, in view of the excellent prices realized by our Dominica onions in New York, they will try again. The Curator of the Botanic Station, in another column, is publishing a notice offering again to procure sets and seeds of Bermuda onions for such planters as may desire to continue their experiments in this direction.

Onions in New York Market.

Messrs. Gillespie Brothers & Co., write:

In continuation of the remarks we addressed to you, respecting onions, on the 4th April (see *Agricultural News* p. 20) we have to say the information received by us from our Cuban friends confirms what we therein wrote in regard to the origin of the seeds. We can do nothing more than recommend that the crates in which onions are shipped should be marked only on the ends and not on the slats, and tightly packed so that they arrive here full and not slack.

Prickly Heat. This, in some cases, is a troublesome affection during the hot season. The writer has found the following treatment effective, especially in the early stages. First, moisten the parts affected with water, then dust over with a small quantity of white oxide of zinc and rub gently with wet fingers until it forms a paste. This will soon dry and leave the appearance of a white wash. Repeat night and morning until the itching and red appearance have entirely disappeared. Sometimes the ointment of white oxide of zinc is used, but this is greasy and disagreeable. Where there is a general tendency to prickly heat, immediately after the morning bath dust over with powder composed of one-third parts of each of the following, viz: white oxide of zinc, boric or boracic acid in powder and starch powder well shaken together.

RECIPES FOR COOKING CHRISTOPHINES OR CHO-CHOS.

The following Jamaican Recipes for cooking christophines or 'cho-chos,' as they are called in that Colony, are taken from *Bulletin, No. 28, Division of Botany*, of the United States Department of Agriculture:—

The cho-cho is a very useful vegetable. It can be cooked in various ways, and the natives are very partial to it, it being as they say, 'so cooling.' They often put it in their soups as an addition. Plain boiled with butter or white sauce, it is excellent; mashed with butter and black pepper, it is nice; put in stews, it makes a pleasant variety; and made into boiled or baked puddings with a judicious addition of sugar and lime juice, it so much resembles apple as to deceive one into believing one is eating apple pudding or apple tart. The baked pudding is particularly good.

Cho-cho, stuffed.—Boil two cho-chos with the skin on. When boiled scoop out the insides (cutting the cho-cho the long way). Remove the seeds and pith, pare away the pulp carefully, leaving enough near the rind not to break with it. Mash the pulp with some nicely seasoned fine mince, to which add a little butter and pepper, and pack the mixture into the cho-cho backs or skins. Cover with fine bread crumbs and bake. A nice side dish.

Baked Cho-cho pudding.—Four good-sized cho-chos boiled with ten cloves, and mashed and prepared as before, only putting the juice of two limes, one half-pound of sugar, one tablespoonful of butter, and some nutmeg. Put the mixture at the bottom of a well-buttered pie dish and cover it with a pint of grated bread. Beat the yolks of three eggs and one white and add to them half a pint of milk sweetened to taste; pour this over the bread crumbs and bake. When it has 'taken colour' and is nicely baked remove it from the fire. Then beat the whites of the eggs left over into a stiff froth; add two tablespoonfuls of sugar: when stiff spread over the pudding. Put back into the oven for a couple of minutes to colour a pale yellow. It is nice either hot or cold.

Cho-cho tart.—Line the pie dish with pastry (pie crust) and leave some to cover the tart. Take six good-sized cho-chos; pare, core, and boil them with a dozen cloves. When tender slice them, not too thin, and put them at the bottom of the pie, sprinkle them with the sugar, the grated lime peel (of one lime) and the juice (of two limes), then cover with pastry and bake from half an hour to three-quarters. Eaten when cold with a cold boiled custard, it is much more appreciated, but it can be served hot as apple tart.

Cho-cho savory.—Cut two boiled cho-chos in fingers; put on anchovy toast and pour very hot cocoa-nut cream over the whole. Serve hot.

Cho-cho Fritters.—Boil three large cho-chos with six cloves until tender, remove the seeds and pithy substance inside and mash the pulp. Squeeze it in a clean cloth until as dry as you can get it. Then mix in one egg well beaten, add butter and pepper (and salt to flavour); a teaspoonful of butter will do, and remove the cloves. Make into fritters and fry in lard.

Yams in Tobago. Ebboa yams succeed well in Tobago in rich loamy soil, particularly if protected from high winds. Planted in January the crop is ready to be reaped in August.

EDUCATIONAL.

Barbados.

The following extract is taken from the recent Report by the Inspectors of Schools at Barbados for the year 1901 :—

'The Imperial Department of Agriculture held another course of lectures in agriculture in September, and ten more male certificated teachers were declared competent to give instruction to their pupils in the principles of Agriculture. There are now 34 teachers who have been placed in the first rank, and who will this year prepare their pupils in this subject. During the year the boys of the 4th, 5th, 6th and 7th Standards were examined in some 24 schools in portions of Blackie's Tropical Readers, Books I and II, and the results were satisfactory ; and we expect still better results this year. At the Local Exhibition held at Blowers on January 14, 1902, the Commissioner of the Imperial Department of Agriculture offered prizes to school children for growing plants in pots and boxes. Seventeen children won such prizes. We hope that many more children will compete for these prizes at the next exhibition.'

Agricultural Teaching.

The need of closer association between the United States Department of Agriculture and the farmers, for whose benefit this Department is supported, is referred to in the report for 1901 of the Secretary of Agriculture as follows :—

I am convinced that the publications of the Department do not in themselves constitute all sufficient means for the dissemination of information on agricultural subjects among our people. While the work of the Department and the stations has already been so far disseminated and applied that it has made important changes for the better in our agriculture, the spread of the influence of these institutions is comparatively slow, because the means for directly reaching the farmers which they now possess are inadequate. The farmers' institutes may in a great measure supply this lack. When properly organized, they will bring to the masses of our farmers the information which they need to enable them to understand and apply the results of the work of the Department and the stations, and will impress upon them, by practical illustrations and demonstrations, the benefits which advanced scientific knowledge may confer upon our agriculture. Through the institutes, as in the case of other educational agencies, the living teacher coming in contact with the living worker can produce results which it is hopeless to expect from printed documents however well written and illustrated.

The Education of the Young Farmer.

In all parts of the world the education of the young generation of farmers and planters is a matter which is occupying a large amount of attention. It has been insisted in some quarters that scientific teaching is of greater importance in this training than anything else,—a point of view which has done harm to the cause of agricultural education. It cannot fail to be recognized, however, that the business qualifications of the farmer or planter are of more importance than a scientific education, and further, that a combination of the two is the ideal at which we should aim. Indeed, without a knowledge of business in its widest sense it is impossible for the practical man to make good use of the results of scientific investigations on agricultural subjects. The question where a training in the scientific principles underlying agriculture should come in the education of the young farmer is one of great importance. In a recent paper Professor Gilchrist deals with this matter in an original manner. *

After pointing out that the education of the young farmer should be such as to give him not only a good elementary education but also qualify him as far as possible for the management of the farm on sound business principles, Prof. Gilchrist states that the essentials of this education are :—

(1.) A good elementary education until the boy is 12 or 13 years old.

(2.) A good general training at a secondary school from 12 to 15 or 16 with special teaching on the commercial side, including book-keeping *and a good grounding in elementary science.*

(3.) The boy should now return to the farm for two or three years during which he should acquire an intimate acquaintance of all practical work connected with the working of the farm.

(4.) Having acquired a knowledge of and familiarity with farming operations, the youth now devotes one or two winters to a really practical course of instruction at a College, spending the summer months on the farm.

5. If the young farmer means to give attention to dairy farming or poultry keeping, he should now undergo a course of instruction in one or other of these branches.

How far the idea of allowing the young planter to learn the details of estate work before taking a final course in Agricultural Science at a College can be followed in the West Indies remains to be seen. If practical, the young planter would certainly appreciate to a far greater extent, than at present, the application and value of a knowledge of scientific principles. The difficulty would be to find teachers and adapt the course of study at Agricultural Colleges to suit young planters who would require special teaching in one or more subjects. The idea is a good one and deserves careful consideration.

Agricultural investigations in the Phillipines.

The West Indian Islands do not seem to be unique in the fact that large quantities of foodstuffs are imported which could be grown locally. It appears that 4,000,000 dollars' worth of agricultural products—mostly foodstuffs,—are imported every year into the Phillipines, and that rice, the leading bread-stuff of the islands, is not at present produced in sufficient quantities to supply the local demands. In consequence of these facts the United States Government has appropriated a sum of money to found an Experiment station in their new Colony in co-operation with the Department of Agriculture.

* The Education of the Young Farmer, by Professor Douglas A. Gilchrist. *Journal of the Royal Agricultural Society of England*, vol. 62, pp. 58-66.

VANILLA IN THE SEYCHELLES.

The following notes on the Vanilla trade of the Seychelles islands are taken from an article contributed by Mr. John R. Jackson, A.L.S., to the *Gardeners' Chronicle* for March 22, 1902 :—

The extension of the cultivation of Vanilla, not only in new plantations, but also in entirely new countries is sufficient proof of its constant demand, and of its value as a profitable crop ; and this notwithstanding the continued manufacture and use of artifical vanilline. The following facts on the present condition of the trade in Vanilla are gathered from our well-informed contemporary the *Chemist and Druggist*, who, in reporting on the Vanilla sales at the end of last month, say that the supply brought forward was the heaviest on record, and attracted a much larger attendance of buyers than usual. There was, however, a good demand, and practically the whole quantity offered, about 2,800 tons, was sold. Long lengths being scarce brought good prices, while medium lengths also sold were pods from 8 to 8½ inches long, and of good chocolate colour, fetched 22*s.* 6*d.* per lb. ; 7½ to 8 inches, 19*s.* 6*d.* to 21*s.* 6*d.* ; and so on in proportion, for it must be remembered that Vanilla-pods are classified in the market and valued according to their lengths, plumpness, and colour. Thus, at the same sale the lowest grade of dry, brown pods realized only from 4*s.* to 11*s.* 6*d.* per lb.

Referring to the condition and prospects of Vanilla cultivation in the Seychelles, Messrs. Brooks & Green, the well-known brokers, state that the Seychelles crop for 1901 shipped from August to December totalled fully double the heaviest quantity exported from the island in any previous season, it being estimated at about 80 tons. The feature of this season's supply of Vanilla from the Seychelles is the unprecedented large proportion of short beans. Medium to good size quality measure from 6 to 8 inches, but the consignments landed in London during the past three months have contained about 75 per cent. of very short beans, ranging from 3 to 5 inches. The result has been that whilst long-length quality has fairly maintained previous values, the short measurements show a reduction of about 50 per cent. To obtain good plump pods, it is incumbent on planters to see that early in the season the young shoots are thinned by picking out a quantity of surplus pods ; in the present case it would seem as though nearly all had been allowed to grow. This view is somewhat confirmed by recent reports from Seychelles, which advise that the flowering for the next crop is small—possibly due to the weakening of the vines last year ; indeed, some of the older plants are reported as seriously exhausted—a very natural result if the above surmise is true.

The warning here given, though not expressed in gardening terms, will be understood by those who cultivate the plant for profit, and who will, no doubt, benefit by the hints.

As an illustration of the quantity of Vanilla sometimes shipped in one consignment, it may be stated that in November last one shipment from the Seychelles amounted to 21,267 kilos, of which 12,386 kilos went to Marseilles, and 8,881 kilos to London. The exports from Tahiti during 1900 amounted to 162,636 lb., of the value of £32,136—no small sum to be added to the finances of the islands.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture returned by last mail from a brief visit to the northern islands. He landed on the 14th. instant at Montserrat and inspected the Grove Experiment Station which he found greatly improved and in good order. He afterwards was present at a public meeting to encourage an extension of the onion industry and left the same afternoon in the R.M.S. 'Spey' for Dominica. In the latter island he inspected the Botanic Station and Agricultural School and accompanied the Administrator to the new estates being opened on Crown lands along the interior road. The prospects of ultimately opening up these lands are very favourable. On the 22nd. the Commissioner inspected the Agricultural School at St. Lucia and landed at Barbados on the morning of the 24th. ultimo.

At the request of planters interested in the lime industry at Dominica arrangements were made for the Hon. Francis Watts to visit the island from the 23rd. to the 27th. ultimo and give a practical demonstration of the methods for preparing commercial citrate of lime. The preliminary experiments were proposed to be made on the Bath estate, closely adjoining Roseau the property of Messrs. Rose. A brief summary of the results will appear later.

The Travelling Superintendent has just returned from a visit to Dominica where he was engaged, in company with Mr. George Branch, in visiting and reporting on the condition and prospects of the Experiment Plots in that Presidency.

VOLCANIC DUST.

By the courtesy of the Government of Barbados the following notes, obtained by the Harbour Master at Bridgetown, on volcanic dust encountered by vessels at sea have been communicated for the use of the Imperial Department of Agriculture. As recorded in the *Agricultural News* the dust at Barbados fell from 5 p.m. on the 7th. until 4:30 on the 8th. May.

Names of vessels arriving at Barbados during the 8th. to the 10th. May that have reported meeting Volcanic 'Dust' similar to that at Barbados :—

May 8 Nor. S.S. 'Talisman' from Demerara reports meeting the dust at 10 p.m. on May 7, 150 miles S.S.E. of Barbados.

" " Schooner 'Violo' from Demerara met the dust 8 p.m. on 7th, 70 miles south of Barbados.

" 10 Bktne. 'Fanny' from Pernambuco met dust 250 miles east of Barbados on the 8th.

" 11 Ship 'Monrovia' from Rio Janeiro met the dust 240 miles S.E. of Barbados on 9th (?8th) at 4 p.m.

" 12 Barque 'Jupiter' from Cape Town met the dust at 2.30 a.m. on the 8th, 830 miles E.S.E. from Barbados.

RECENT REPORT.

The Decay of Timber and methods of preventing it. By Hermann Von Schrenk, *Washington. Government Printing Office, 1902.*

This bulletin, recently issued by the Bureau of Plant Industry of the United States Department of Agriculture contains an admirable and concise account of the structure of timber, the factors which cause decay of wood, and the various impregnating methods which have been devised to arrest decay. It is illustrated by a large number of plates and figures in the text, and the subject is dealt with in a very clear and readable manner.

The gradual decay of timber is due to the ravages of fungi and bacteria, and as these organisms require water and air for their development, decay is much more rapid where both these conditions (moisture and air) are present to a sufficient extent. The general principle involved in the preservation of timber is to impregnate it with some antiseptic substance like zinc chloride or creosote, which prevents the growth of fungi and bacteria. The life of timber is very greatly lengthened by these processes, and the results more than justify the cost of the process. To civil engineers and others interested in this important question we recommend this bulletin as giving an up-to date account of timber preservation.

Birds and Fruit.

The following interesting note on this subject is quoted by the *Agricultural Journal,* Cape of Good Hope from the *Texas Stock Journal*:—

I learned a trick while in the Philippines in the matter of keeping birds out of fruit trees,' volunteered a well-known official of the Department to a *Washington Star* reporter, which may be of value to many just now, when so many cherries are being destroyed by birds. It is simple, inexpensive, and, as far as I could observe, practical. It consists in hanging a small mirror on the top limbs of the tree. There should be at least six inches of string to the mirror, so that it can swing about as it is blown by the wind. The flash of the mirror, it appears, scares the birds away. One or two five-cent mirrors hung on a tree is sufficient, though, of course, three or four would be much better. I was told that this method had worked in the Philippines successfully for many years, and that the birds do not grow familiar with it as they do with a scarecrow. Since my return here I find that the mirror scare is not unknown here, and that it has been in use by Michigan fruit growers for many years. I have tried it myself in a small way, and it is amusing what a stir it creates among the birds.

Young palm leaves. The manner in which some young palm leaves open is very interesting. In the common cabbage palm, for instance, the young leaf looks like a green stick pointing vertically to the sky. After a time it begins to open at the top. This rolling up of the young leaf is a device on the part of the palm to prevent the drying up of the tender tissues of the leaf before they have developed a thick protective covering.

SCIENCE NOTES.

Fever in Plants.

Although animals and plants seem, at first sight, to be two absolutely distinct groups, and to have little in common, closer investigation points unmistakably to the fact that they they are very similar and very closely related to one another. Further, many organisms are known which it is impossible to class, with certainty, as plants or animals. Let us confine our attention, for the moment, to one of the ordinarily recognized signs of life, namely breathing or respiration. Both animals and plants breathe. In both oxygen is taken in from the air, and after certain changes carbon dioxide is given out. This process it is true is masked in green plants, during exposure to sunlight by another process in which carbon dioxide is taken in and oxygen given out. It goes on however in a plant as steadily as in an animal and there is no essential difference between the respiration of man and the humblest vegetable he cultivates.

In man it is not uncommon to find that when the health is affected his temperature rises, in other words he becomes feverish. At the same time the rate of breathing is often increased. Is this true of plants also? Can we throw a potato or an onion into a fever? The idea seems absurd. Yet it is an ascertained fact. It was shown by Mr. H. M. Richards (*Annals of Botany*, Vol xi., p. 30,) that if potatos or onions were sliced,—that is to say wounded—their temperature rose, and their breathing became more vigorous They exhibited in fact two of the characteristic symptoms of a feverish person. The rise of temperature was carefully measured; in some cases it was as much as 3° C. The course of the fever was followed, and was found to reach its height usually about 24 hours after the injury, the temperature then began to fall and reached the normal again on the fourth or fifth day. Experiments such as these help to bring home to one in a striking manner the fundamental relationship between animals and plants.

Experimental Potato Culture.

Experiments with potatos extending over a long period of years show the advantages of using sprouted potatos for seed to be, an increased total yield, increased earliness, larger starch content, and a more vigorous growth of the vines. Planting tubers in rows 2 feet apart and 1 foot distant in the row gave better results than greater distances, it increased the yield and hastened the maturity of the crop, the tubers were better formed and richer in starch. Average sized whole tubers used for seed gave better returns than large or small sized whole tubers. Small seeds, while possessing great vigour of reproduction, tends to the production of small tubers. Pieces weighing on an average 4 oz. and carrying two eyes were better for seed than whole tubers of the same weight. The advisability of cutting seed tubers largely hinges on the variety to be planted. The above should be understood to apply to English, not sweet, potatos.

The Soufriere Bird. One of the chief objects of interest to the visitor of the crater of the now famous Soufrière at St. Vincent was the mysterious Soufrière bird (*Myiadestes sibilans*) specimens of which were secured by Mr. F. A. Obers some years ago for the Smithsonian Institution at Washington. It is hoped that this bird is to be found on some of the other mountains in St. Vincent and has escaped destruction by the recent eruption.

A REPUTED CURE FOR LEPROSY.

Some interest was aroused recently by a newspaper statement that a plant called 'Tua-tua,' and reported to be a native of Venezuela, was being used at Honolulu in the treatment of leprosy, with some benefit. According to the *Pharmaceutical Journal* for February 15, 1902, the plant is probably *Jatropha gossypifolia*, Spurge Order *(Euphorbiaceae)*.

This is the species which has been identified by the late Dr. Ernst, of Caraccas, as the 'Tua-tua' of Venezuela. But there is nothing in the description of the uses of the drug given by G. Pompa in his *Coleccion Medicamentas Indigenas* (Caraccas, 1868) that indicates any special efficacy in leprosy. He states that a decoction of the leaves, made with a little salt, is used as a mild purgative in indigestion or other disorders of the stomach, and in fevers. A decoction of the root is said to be excellent for dropsy. The milky juice obtained by cutting the young shoots is applied to ulcers of the mouth. *Jatropha gossypifolia* is found in two forms—*staphysagriæfolia* and *elegans*, from Mexico to Brazil. In British Guiana it is recorded from near Demerara; it also occurs in the Niger district in West Africa. *Jatropha Curcas*, [the Physic-nut] a nearly allied tropical species, has a good reputation in India as an application to indolent ulcers, and *J. gossypifolia* may therefore be expected to be similarly useful.

Jatropha gossypifolia is common throughout the West Indies, and has some reputation in native medicine for digestive complaints. Amongst its local names are 'belly-ache bush,' 'wild cassava' and *Medicinier bâtard.*

HAND-BOOKS TO THE WEST INDIES.

The following Hand-books afford interesting information of a descriptive, statistical and general character respecting the West Indies. They also contain particulars respecting the imports and exports and the agricultural resources of the Colonies enumerated :—

Hand-Book of Jamaica for 1902, comprising Historical, Statistical and General Information concerning the Island. Twenty-second year of publication. London : Edward Stanford, 26 and 27 Cockspur Street. Jamaica : Government Printing Office, Kingston.

British Guiana Directory and Almanack for 1902. Georgetown, Demerara : C. K. Jardine.

Trinidad and Tobago Year Book, 1902. Thirty-seventh year of issue. Compiled by James Henry Collens. Port-of-Spain : Muir, Marshall & Co.

The Mirror Almanack and General Commercial Directory of Trinidad and Tobago. Port-of-Spain : Mole Brothers.

The Grenada Hand-book, Directory and Almanack for the year 1902. Compiled by the Colonial Secretary. London : Sampson Low, Marston & Co., Ltd.

The St. Lucia Hand-book, Directory, and Almanac for 1902. Compiled by Everard G. Garraway, Castries, 1902.

The Barbados Directory and West Indian General Advertiser, 1901. Compiled by S. J. Fraser. Bridgetown Barbados : King & Co.

Lightbourn's West Indian Directory and Commercial Directory. J. N. Lightbourn, St. Thomas.

AGRICULTURAL INSTITUTIONS IN THE WEST INDIES.

Jamaica Board of Agriculture : *Chairman* : The Hon'ble Sydney Olivier, C.M.G.; *Secretary* : W. R. Buttenshaw, M. A., B.Sc. ; *Publication*—Occasional Bulletin.

Jamaica Agricultural Society (with thirteen affiliated Branches). Kingston, Jamaica. *President* : Sir Augustus W.L. Hemming, G.C.M.G. *Deputy Chairman* : Hon'ble Wm. Fawcett, B.Sc., F.L.S. *Secretary* : John Barclay. *Publication* : "Journal of the Jamaica Agricultural Society."

Royal Jamaica Society of Agriculture & Commerce & Merchants' Exchange, Kingston, Jamaica. *President* : Hon'ble Lieut-Colonel Ward, C.M.G. *Secretary* : J. L. Ashenheim. *Publication* : Annual Report.

The Institute of Jamaica : Kingston, Jamaica. *Chairman* : Sir Fielding Clarke. *Secretary* : Frank Cundall, F.S.A., *Curator of Museum* : E.S. Panton *Publications* "Journal of the Institute of Jamaica." "Jamaica in 1901."

Kingston & St. Andrew Horticultural Society. Kingston, Jamaica. *President* : Hon'ble Wm. Fawcett, B.Sc. *Secretary* : William Harris, F.L.S.

British Guiana Board of Agriculture, Georgetown, Demerara. *Chairman* : Hon'ble A.M. Ashmore, C.M.G. *Deputy Chairman* : J. B. Harrison, M.A., C.M.G., ; *Secretary :* Oscar Weber : *Agricultural Instructor:* R. Ward : *Assistant Instructor in Agriculture :* J. E. Beckett (on probation) ; *Veterinary Surgeon* : J. A. Raleigh.

British Guiana Royal Agricultural & Commercial Society Georgetown, Demerara. *President* : Luke M. Hill, B.A., M.I.C.E. *Secretary* : Thomas Daley. *Local Secretary* : (Berbice,) Dr. C. F. Castor. *Assistant Secretary and Librarian* : J. Rodway, F.L.S.. *Curator of Museum* : Richard Evans, M.A., B.Sc., *Publication* : "Journal of the Royal Agriculture and Commercial Society of British Guiana."

Trinidad Agricultural Society, Port-of-Spain, Trinidad. *President* : Sir Alfred Moloney, K.C.M.G. *Secretary* : Edgar Tripp. *Publication* : "Proceedings of the Agricultural Society of Trinidad."

Grenada Agricultural Society, St George's, Grenada. *President* : Sir Robert B. Llewelyn, K.C.M.G. *Secretary:* W. E. Broadway. *Publication* : Minutes of Meetings.

Barbados General Agricultural Society & Reid School of Practical Chemistry, Bridgetown, Barbados. *President* : Sir. George C. Pile, Kt. *Secretary* : J. H. Poyer. *Publication* : "Barbados Agricultural Gazette and Planters' Journal."

St. Lucia Agricultural Society, Castries, St. Lucia : *President* :————*Secretary* : R. G. McHugh.

Dominica Agricultural Society, Roseau, Dominica. *President* : The Hon'ble Hesketh H. Bell. *Secretary* : A. K. Agar.

Antigua Agricultural Society. *President*———— *Secretary* : W. N. Sands.

St. Kitts-Nevis Agricultural Society. *President :* Honourable E. G. Todd. *Secretary :* C. A Smith.

[Further particulars of Agricultural and Horticultural Institutions in the West Indies would be gladly received for this list. Also fixtures for Agricultural Shows for 1902.]

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is desirable that inquiry be made, beforehand, as to the terms on which such produce will be received, and whether the market is favourable or not.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—
B. S. Bayley, Water Street Georgetown.

TRINIDAD—
J. Russell Murray, Port-of-Spain.

BARBADOS—
T. S. Garraway & Co., Bridgetown.

ST. LUCIA—
Captain H. Henville, Contractor and Agent, Castries.

MARKET REPORTS.

London,—May 13, 1902.—Messrs. J. Hales Caird & Co., and Messrs. Gillespie Bros. & Co.

Bees-wax—Jamaica, £7. 15. to £8. per cwt.

Cacao—Trinidad, good red, 59/- to 63/6, fine, 64/- to 65/- per cwt.
Grenada, fair common 53/- to 56/-, good to fine 57/- to 60/-. per cwt.
Jamaica, fair 52/6 per cwt.
Dominica, fair 53/- to 56/- per cwt.

Coffee—Jamaica, good. ordinary 30/- to 33/6, good middling bold 59/6 to 79/6 per cwt.
Costa Rica, middling 60/- to 65/-; fine bold 87/6 to 90/- per cwt.
Peaberry 60/6 to 91/- per cwt.

Cotton—Carriacou, $5\frac{3}{16}$c. per lb.

Ginger—Jamaica, good bold bright 55/- to 61/-, common 34/-, to 35/- per cwt.

Honey—Jamaica, fair to good liquid amber 16/6 to 19/6, dark 14/6 to 15/- per cwt.

Lime Juice—Raw, 1/- to 1/3 per gallon. Concentrated, £12. per pipe.

Oil of Limes—Distilled 1/6 per lb. Hand pressed 4/ per lb,

Pimento—$2\frac{3}{4}d.$ to $3d.$ per lb.

Sarsaparilla—Jamaica, fair damaged 1/2 to 1/3, native red, fair, $11d$ to $11\frac{1}{2}d.$ per lb.

Sugar—Muscovado 11/6 to 14/- Crystallized 14/- to 15/- per cwt.

Logwood—Jamaica £4. 5/- to £4. 15/- per ton.

Fustic—Jamaica £4. 10/- to £4. 15/- per ton.

Fruit—Covent Garden Market (Gardener's Chronicle, May 3rd. 1902.)

Bananas—7/- to 10/- per bunch.

Lemons—6/- per case.

Mangos 10/- to 12/- per dozen.

Oranges—7/6, to 18/- per case.

Pines—3/- to 4/- each.

New York,—May 16, 1902.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaica, 9 hands $1.20 to $1.25, 8 hands 80c, to 90c., 7 hands 45c. to 50c. per bunch.

Cacao—African $12\frac{3}{4}$c., to 13c. Caracas. fair to good ordinary $14\frac{1}{4}$c. to 15c. Jamaica, good fermented $11\frac{3}{4}$c. Grenada 13c., Trinidad 13c. to 14c. per lb.

Cocoa-nuts—Jamaicas, $20.00 per M. Small Trinidads $12.00 per M.

Coffee—Rio, good ordinary $5\frac{1}{2}$c. Jamaica ordinary $5\frac{3}{4}$c. to 6c., and good ordinary $6\frac{3}{4}$c. per lb.

Ginger—8c. to $8\frac{1}{2}$c per lb.

Pimento—$5\frac{3}{4}$c. to 6c. per lb.

Rubber—Nicaragua Scrap $51\frac{1}{2}$c. to 52c. per lb, sheet 46c. to 47c. per lb. Guayaquil Strip 49c. per lb.

Sugar—Muscovado, 89°, $2\frac{5}{8}$c. to 3c. Centrifugals 96°, $3\frac{1}{2}$c per lb.

INTER-COLONIAL MARKETS.

Antigua,—May 21, 1902.—Messrs. G. W. Bennett, Bryson & Co., Ltd.

Molasses—8c. per gallon, package included.
Sugar—Muscovado $1.10 per 100lb., nominal.

Barbados,—May 24, 1902.—Messrs. T. S. Garraway & Co.

Arrowroot—good quality, $3.50 per cwt.
Cacao—$12.25 to $13.00 per cwt.
Coffee—Jamaica and ordinary Rio $9.50 to $10.25, respectively.
Hay—lotting $1.75 per 100lb.
Molasses—$7\frac{1}{2}$c. per gallon and $4.00 for package.
Onions—lotting $4.75 to $5.00 per 100lb.
Potatos—Bermudas $3.84 per barrel.
Rice—Ballam $4.90 per bag. Patna $3.75 per bag.
Sugar—in hogsheads, $1.05 per 100lb. and $5.00 for hogshead, in bags $1.25 per 100lb.

British Guiana,—May 22, 1902.—Messrs. Weiting & Richter.

Arrowroot—$6.50 per barrel.
Cacao—native 11c. to 12c. nominal.
Cassava Starch—$6.00 per barrel.
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica 12c. to 13c. per lb. (retail.)
Eddoes—$1.44 per 100lb.
Onions—string $3\frac{1}{2}$c., loose 3c per lb.
Pea Nuts—American $4\frac{1}{2}$c. to 5c. (retail)
Plantains—20c. to 30c. per bunch.
Potatos English—$3.00 per barrel.
Rice—Ballam $4.80, Patna $5.65, per bag.
—Creole Rice 20c. per gallon, retail.
Sweet Potatos—Barbados $1.20 to $1.32 per 100lb.
Tannias—$1.44 per 100lb.
Yams—$1.80 to $1.90 per 100lb.
Molasses—Vacuum Pan yellow 16c. per gallon, casks included.
Sugar—Dark Crystals $1.65 to $1.68, yellow $2.15 to $2.30 per cwt.
Timber—Greenheart 32c. to 40c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—May 21, 1902.—Messrs. Gordon Grant & Co.

Cacao—$13.10 to $13.75 per cwt.
Coffee—Venezuela, ordinary 7c. per lb.
Onions—$1.25 to $1.50 per 100lb.
Potatos English—$1.27 to $1.40 per 100lb.
Rice—Yellow $4.50. White Table $5.25 to $6.00 per bag.
Sugar—White Crystals $3.25, Yellow Crystals $2.00 to $2.10 per cwt.
Molasses—Bright Eastern Muscovado 10c. to 12c. per gallon and $5.00 for package.

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Annual Income	245,343
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May 22, 1902.

H. J. INNISS,
Secretary.

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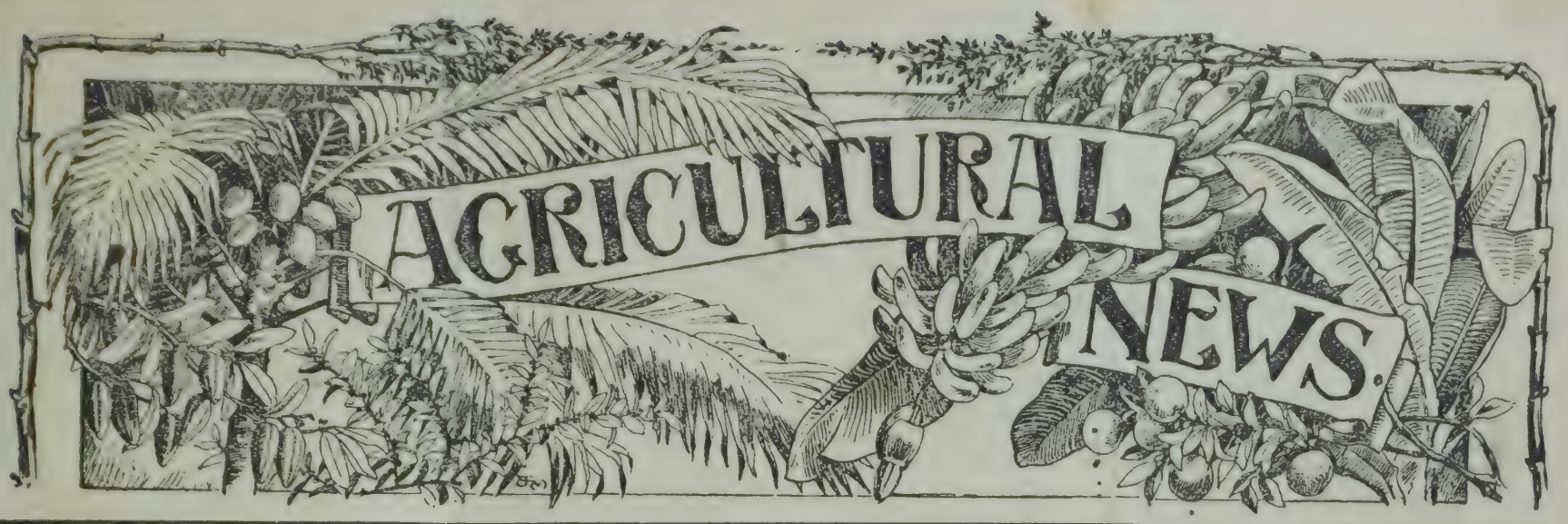

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. I. No. 5. BARBADOS, JUNE 21, 1902. PRICE 1*d.*

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Agricultural Shows.

THROUGHOUT the world the value of Agricultural Exhibitions and Shows has been recognized and they have been made use of as a means of stimulating interest in the agricultural products of a country, and of encouraging that healthy rivalry which is so essential to success. Some parts of the West Indies have not been behindhand in this respect and Agricultural Shows have been held for many years in the larger Colonies. In the smaller islands however, they have, until quite recently, been practically unknown. The importance of this 'effective means of bringing into notice the resources of these islands and of creating an intelligent interest in improving the cultivation of the soil and in prosecuting new industries' was not lost sight of when the Imperial Department of Agriculture was established, and in the original scheme a considerable sum was set aside for Agricultural Shows. Up to the present the Department has spent some £350 annually on this branch of its work. With the exception of a comparatively small sum utilized in providing special prizes and diplomas at previously established Exhibitions, the grant has been devoted to starting and fostering new Agricultural Shows, especially adapted for the encouragement of the peasant and small proprietor. Successful shows are now regularly held, under the auspices of the Department, in Grenada, St. Lucia, Dominica, Montserrat, Antigua, and the Virgin Islands. In Barbados, where exhibitions have been held for many years, a local Agricultural Show is held annually in different parts of the country (see p. 70).

The organization of Agricultural Shows throughout the West Indies is now an accomplished fact, and it only remains to take steps to ensure that the best possible results may be obtained. One most important step towards this end is to establish and maintain

some standard of merit for prize exhibits. *No prize should be awarded to any exhibit merely because it happens to be the best in its class at a particular show.* Produce is too often presented badly prepared, or in a slovenly and uninviting condition, and the award of prizes to such exhibits does more harm than good and tends to encourage the people in unskilful and careless habits, thus destroying any chance of their obtaining remunerative prices for their produce. The work of reforming these evils will be long and tedious, but it is work of vital importance and well worth doing. On the quality of the produce largely depends the final success or failure of many of the industries of these islands, and, in improving that quality, an invaluable aid is now to hand in Agricultural Shows.

SUGAR INDUSTRY.

Disease of Cane Cuttings.

Mr. John M. Fleming of Diamond Plantation, Demerara, writes:—

Mr. Howard's latest paper on the pine-apple disease, in what he calls cane cuttings, has been read by me with great interest. In ordinary field work we use almost entirely the cane top, but in propagating new varieties from hard cane, I have had extensive failures, which I attributed to the weaker germinative power of the sweet hard portion of the cane. On the next occasion that I have to deal with such material, I shall employ the treatment with tar and Bordeaux mixture he recommends and has found effectual in Barbados.

Molasses Foods for Stock.

On page 22 of this Journal we drew attention to 'molascuit,' a food for cattle made from molasses, and the finer fibrous portions of the sugar-cane. In Germany and elsewhere somewhat similar foods have been manufactured from molasses and fine peat. The May number of the *Journal of the Chemical Society* records the following composition of 'peat molasses' containing 24 per cent. of peat and 76 per cent. of molasses:—

Water	19·00 per cent.
Sugar	31·70 " "
Soluble matters...	20·93 " "
Insoluble " ...	19·46 " "
Ash	8·91 " "

Good results were obtained by feeding horses with the food, a suitable mixture being, molasses 45 parts, sesame 27·5, ground earth-nut husks 27·5 parts.

Beet Sugar Production in Europe.

The *Louisiana Planter* for February 15, 1902, reports:—

The International Union for Sugar Statistics has just published the following results of its investigation, made in December, 1901, as to this year's beet-sugar crop in European countries. While these figures still are approximate estimates, they are considered to be as nearly correct as can be made before the final estimates are prepared at the end of the season:

Country.	*Production of Sugar.* *1901-2.* Tons.	*1900-1.* Tons.
Germany	2,220,850	1,974,785
Austria	1,306,900	1,083,300
France	1,080,300	1,100,171
Russia	1,079,550	893,520
Belgium	325,000	320,000
Holland	200,100	178,100
Sweden	121,392	115,547
Denmark	57,500	50,760
Other	221,000	.....

There will be apparently an overproduction of sugar in Europe, amounting to 1,000,000 tons in excess of the normal consumption, and the stock to be carried over to next season may be 1,500,000 tons. Of course, the effect of this is unprecedentedly low prices. In December, raw sugar was quoted at the Magdeburg exchange at 1·62 cents per pound. It would seem that the unprofitable business would check overproduction, but the entire beet-sugar industry of Europe is on an artificial basis.

The Utilization of Cotton Seed.

Some of the uses to which this former 'waste product' can be put are well summarized in the following extract from the *Queensland Agricultural Journal* for March 1901:—

In bygone days cotton-planters considered cotton seed to be an unavoidable nuisance. They burned it, dumped it into the rivers, used it as manure, or as filling-up stuff—anything to get rid of it. American wit, however, has turned into a vast and profitable channel this one-time burden. It was found that a ton of cotton seed would produce from 35 to 40lb. of oil, and that every particle of the residue would be made into a marketable article. There are to-day 500 mills in the Southern States representing an investment of £5,000,000, and the yearly value of the products from these mills is over £10,000,000. In Texas the mills pay from £2. 10. 0. to £3 per ton for cotton seed, which means 25*s* to 29*s* per bale of cotton if all the seed is sold. It takes about 1,500 to 1,600 lb. of cotton in the seed to produce 500 lb. of clean lint. Now, a Mr. Robert Thomas, of Atlanta, Georgia, has invented a process by which finer and better paper can be made from cotton seed-hulls than from wood pulp. As we noted in the last issue of the *Journal*, a company with a capital of £1,000,000 has been formed to erect a chain of paper-mills throughout the south—in Georgia, Alabama, Mississipi, Louisiana, Florida, and Texas. The first of these plants, one costing $300,000 (about £60,000), will be erected at Atlanta, Ga.

Years ago it was predicted that the day would come when a process would be discovered to manufacture, at small cost, paper from either the seed, lint, or stalk of cotton. There is every reason to believe that this industry, if it proves the success that is promised, will, as Mr. Thomas says, so increase the demand for cotton seed as to raise the present price of $12 (£2. 10.) a ton to $30 (£6. 5.) or more. Hitherto the value of the seed has been based mainly on the oil and meal left after the extraction of the oil. If the price of the seed is increased to $30 a ton by the demand for paper made from the hulls, it is estimated that the new industry will add fully $100,000,000 (£21,000,000) to the value of the cotton crop of the South.

VANILLA.

Cultivation in the Seychelles.

In various localities in the West Indies attention is being directed to the cultivation of Vanilla. Experiments on the growth of the plants and curing of the pods are being conducted at some of the Botanic Stations, and planters are also putting the question of the possibility of the industry in the West Indies to a practical test. We have already referred in these columns to the vanilla industry of the Seychelles (*Agricultural News*, p. 60.) The most complete and exhaustive account of the cultivation as practised in those islands is that of Mr. S. J. Galbraith, published in 1895, as *Bulletin No. 21*, Division of Botany, of the U.S.A. Department of Agriculture. Mr. Galbraith was 'for many years a successful planter in the Seychelles and in a most favourable position to write on the subject.'

We propose to reproduce the greater portion of this valuable publication in these pages. The present article contains a summary of the general conditions of the industry in the Seychelles and the directions for the arrangement of trees on which to train the vines :—

GENERAL CONDITIONS.

'If kept free from disease the vanilla is a plant of extraordinary vitality ; and in the Seychelles, where moisture and heat, its main requirements, are both ample, the sort of soil it is grown in seems to be of no great importance, provided that, if it be very poor, the roots are kept well supplied with manure. It is cultivated in the Seychelles from near sea level to 1,800 feet altitude, and does well (except for disease) at all altitudes between these extremes.'

The rainfall is about 100 inches in the low lands, and 10 to 30 per cent. greater in the hills. The fall is fairly evenly distributed throughout the year, but a dry spell, which is necessary to bring vanilla into flower, is to be looked for in July, August, or September, while the heaviest rains most frequently come in December. . . . . The range of shade temperature for day and night, from sea level to 1,800 feet, may be put at 90° to 70° F. The former is exceptional, the latter frequent. . . . The plant does well in three very different types of soil,—a rich vegetable mould, a greasy red clay, and a coarse quartz sand. Though so unpromising to look at, the latter is, perhaps the best of all. It gives free drainage to the roots, and in wet years plants fixed on it are more likely to crop than those on closer soils, while with ample manuring they grow remarkably well.

ARRANGEMENT OF PLANTATION.

The manner of setting out plantations in the Seychelles has undergone changes within the last twelve years. Formerly plantations were seen with the rows of vines planted so close together as scarce to leave room for workers to pass between them. The yield per acre under such conditions was sometimes enormous, but when disease once started in a vanillery thus arranged, its destruction was rapid and complete, so this system has been mostly given up. Since the loss of so many close-lined plantations, the distance between the rows has been increased. Living wood, i.e., small trees, are used as supports for the vines, these being festooned from fork to fork, but many planters have made use of hard-wood posts and bars, the former being notched on top and the latter laid in the notches, resting thus from 4 to 6 feet from the ground, according to fancy. Over these bars the plants are hung being looped up as growth is put on. Wire is sometimes also used instead of horizontal bars. It is much cheaper, but otherwise has disadvantages, notable among which is that it sways with wind and is liable to break the vines, the curvature being too sharp over such a small round surface. However, when plants thicken into a mass this last drawback mostly disappears.

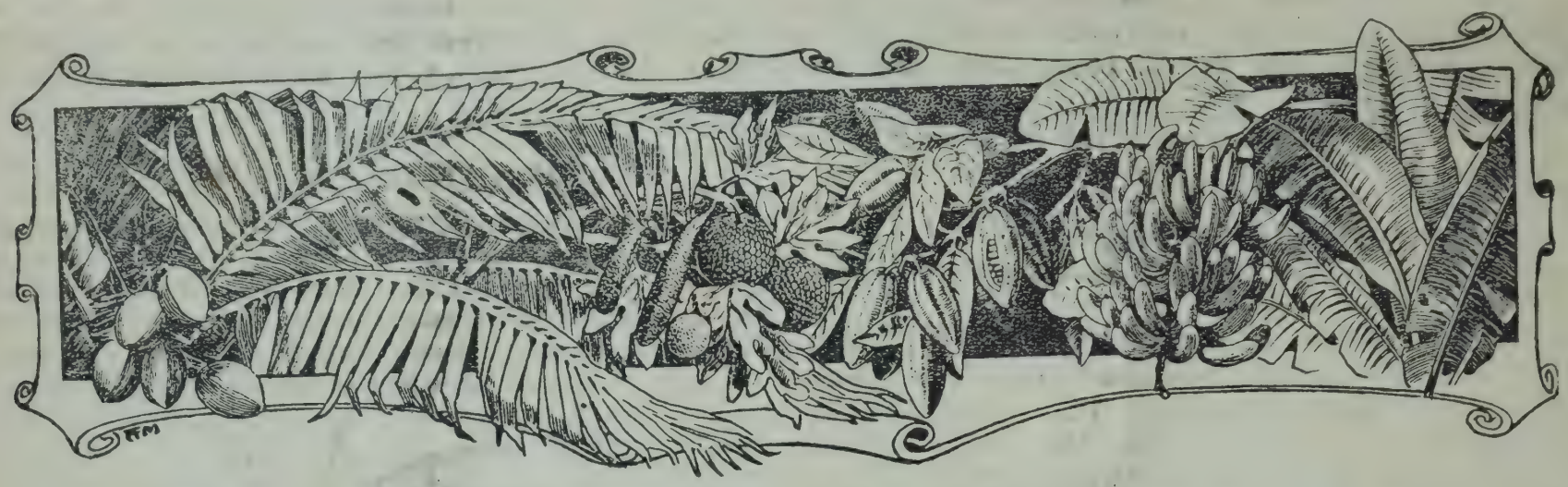
A third, and, as the writer believes, much better way of growing vanilla, is now more generally coming into practice. This is to plant each creeper on a tree of its own, and where land is cheap it is an advantage if these are well apart. So arranged, the general maintenance of a vanillery is certainly more expensive, inasmuch as isolated plants require more manure than when the same number are closely grouped together. The work of flower pollination and crop gathering is also more laborious. But more than a counterpoise to these disadvantages is the increased security this method of planting gives against wholesale destruction from disease ; for when so arranged a sick plant can be removed and destroyed with greater chance of this being done before any of its neighbours become affected ; whereas when growths of different plants are interwoven, either in their roots or shoots, it is difficult to know when enough has been taken up, and there is every likelihood of the disease becoming established beyond control.

USE OF TREES AS SUPPORTS.

To give some notion of how a vanilla plantation is set out and carried on in this Colony, it will be convenient to assume that the tree method of planting is the one adopted. A great variety of trees will serve the purpose. Here, on most properties, there is an abundance ready for the work ; but of course where this is not the case, suitable trees must first be planted. In selecting trees those should be chosen which do not grow too large, but give moderate foliage (about half shade) without ever losing all their leaves at once, and having plenty of branches from 5 to 7 feet from the ground, affording forks enough to train the vines through.

No hard and fast rule can be laid down as to the distance trees should be kept apart. Here, formerly, as above stated, vanilla was grown in dense masses with great success for a time. Elsewhere it may be advantageously so grown now. However, it is safe to state that overcrowding in any kind of planting invites disease, and the farther plants are kept apart the more likely are they to remain healthy. A 4-foot radius would be a moderate allowance for the roots of a vigorous vanilla plant, and if 1 foot is kept clear around the circle allowed to each plant's roots this would give 9 feet as the distance between the trees. It would be difficult to insure the plants being kept distinct in less space. Where suitable trees are already growing on the land to be planted, these can be thinned out if too close, or they may be left in small lots of three or four or more together, a sufficient clear space intervening between each lot ; but in that case if one vine of a group showed disease the whole would have to be removed. Many trees stand topping, and it is a great advantage when they do, for on being cut 7 feet or so from the ground branches spring from near the cut part at a convenient height, and the best situated of those can be chosen to train the vines through, the rest that grow awkwardly being removed. About 5 feet from the base is low enough to allow any to grow.

(To be continued.)



WEST INDIAN FRUIT.

BANANAS FROM BARBADOS.

Recently the Royal Mail Company invited the assistance of the Imperial Department of Agriculture to test a new 'fruit carrier' proposed to be used to convey bananas from the West Indies, slung in a kind of hammock, so as to give the fruit plenty of air while at the same time prevent it from being bruised in transit. The inventor had had considerable experience of the Canary banana trade and was anxious to devise a plan whereby West Indian fruit could arrive in England in as fresh a condition as the Canary fruit.

In the first instance two bunches of bananas were obtained by Mr. J. R. Bovell in Barbados. These were of the Chinese or dwarf variety generally cultivated in the island on account of its low stature, and its being less liable to be injured by wind. The fruit was green, but full, and cut the day before it was shipped.

One bunch was packed hammock-fashion in the new carrier as suggested by the inventor. The other, as a supplementary experiment, was packed, at the instance of the Commissioner, in accordance with the method adopted in the Canaries. The latter bunch was first of all wrapped in a sheet of cotton wool, covered with several folds of newspaper and afterwards firmly packed in a light wooden crate with wood-wool. Dry grass or hay would have answered equally well. In this condition air was excluded from the fruit but the cotton wool was intended to absorb moisture and keep it sweet; while the packing of paper and wood-wool within the wooden crate prevented all possibility of injury in transit.

The Report on the fruit after its arrival in England has since been kindly communicated by Commander Owen. It is as follows:—

> The two bunches of bananas which I saw at your office this afternoon, just in from the West Indies, were in excellent condition. From their freshness and good green colour they might have merely come from the Canaries. The bunch packed in 'Canary fashion' had a particularly fine and clean appearance, but I fear the packing will be found rather too hot as a general rule. Owing to a mistake in the way of placing the bunch in the new carrier, this one was slightly less good. But what particularly impressed me was the fact that both bunches are not of the usual West Indian kind of banana (the Gros Michel), but are the Chinese or Cavendish banana, which is the variety imported so largely from the Canaries. If the Cavendish banana proves on trial to carry better than the other, an impetus in the West Indian fruit trade should follow, because this is the kind which is preferred in the English market.
>
> It is possible that further trials will be made with the new carrier, but special interest attaches to this report as it has been shown that the Chinese banana, so much liked in England, if packed in a crate, will carry as well from the West Indies as from the Canary islands. Further, that it may be possible for Barbados and some of the other islands that are a thousand miles nearer England than Jamaica to grow an appreciable quantity of the Chinese banana and start a trade with England.
>
> It is proposed to make further trial shipments of this banana in crates in order not only to thoroughly test the market for this particular variety, but also to arrive at a comparative estimate of the profits likely to arise after payment of all expenses.

EXPLOSION ON 'PARA.'

BOARD OF TRADE INQUIRY.

The serious explosion that took place on board R.M.S. 'Para' when at sea between Jamaica and Barbados, on November, 21 last, excited a good deal of interest at the time. Three lives were lost, including that of the inventor, and five other persons injured. In addition, the ship sustained serious injury whereby the whole of the fittings on all four decks were wrecked, including the saloon and mail rooms.

According to the report of an Inquiry held by the Board of Trade on February, 6, last, and recently published, the explosion occurred in connexion with an apparatus for preserving fresh tropical fruit installed by Lawton's Patents, Limited. The fruit (2,000 bunches of bananas from Jamaica) was enclosed in an air-tight chamber supplied with a gaseous mixture previously sterilised by passing over red-hot coke, purified and afterwards cooled by passing through a refrigerator. The latter was fitted by the Linde Refrigerator Company. It is stated that this had nothing to do with the explosion. The active principle of the gaseous mixture supplied to the chamber was carbonic oxide (CO). It is well known that 'this is an inflammable

gas capable of forming with air a mixture which is not only explosive, but also very easily ignited; dull red heat according to Dr. Dupre, being sufficient for the purpose.'

If the original intention of the inventor of the air-tight chamber had been strictly carried out, it is maintained that there was no actual danger; but, evidently, leakage took place in the chamber and air found its way in to replace the gas that was escaping, thus forming an explosive mixture.

The immediate cause of the explosion was probably the placing of electric wires and lamps not properly protected inside the chamber. This was done without the knowledge or consent of the Royal Mail Company.

The official Report by Captain Thomson, H.M. Chief Inspector of Explosives, concludes as follows:—

Having detailed the facts in connexion with this accident, and the conclusions which I have drawn from them, I am now enabled to furnish replies to the special questions which the Board of Trade have placed before me:—

(1) Whether the gaseous mixture intended for preserving fruit in a closed chamber is explosive, and, if so, under what conditions?—The gaseous mixture can become explosive when air in certain proportions is added.

(2) Whether any notices or cautions were issued by Lawton's Patents, Limited, as to the danger, if any, likely to arise from the use of such gaseous mixtures?—No.

(3) Whether the Royal Mail Steam Packet Company took measures to ensure that the gaseous mixture was so used on board the 'Para' as to prevent danger to that vessel?—No. The Company were ignorant of the fact that any danger could arise from the gaseous mixture.

(4) Whether any special precautions were taken in fitting up the electric light in the chamber, and whether the lamps and wires were carefully examined so as to ensure that the wires were completely insulated?—No. The method of fitting up and the materials used were altogether unsuitable. No examination was made by any competent person.

(5) Whether the gaseous mixture in the chamber on the evening of November 21, was explosive?—Yes.

(6) Whether gas was being admitted into the chamber at the time of the explosion?—No.

(7) If the gaseous mixture in the chamber was explosive, how did it become ignited?—It probably became ignited by electrical means, either from the faulty electric light circuit or from the electrical thermometers. The former is the more probable source of ignition.

(8) What was the cause of the explosion?—The cause of the explosion was the formation of an explosive mixture of carbonic oxide and air in the chamber, and the ignition of this mixture probably by an electric spark due to a defect in the electric fittings.

It is desirable to add that while this experiment has ended so disastrously, an invention which will preserve fresh tropical fruit and at the same time control its ripening is likely to prove of considerable value to the West Indies.

Captain Thomson is of opinion that the Lawton process, if really effective to attain the objects in view, could still be allowed, under proper control, on board ship. He places on record the precautions that are necessary and emphasises that the whole apparatus should be placed under the strict control of a competent expert, that all lights should preferably be on the outside of the chamber and that effective steps be taken to prevent the escape of gas so that the chamber should be actually, and not nominally, air-tight.

GRAFTING NUTMEGS.

The nutmeg tree (*Myristica moschata*), a native of the Moluccas and other East Indian islands, has been introduced into many countries and is now familiar throughout the tropics. The nutmeg, in common with a considerable number of other plants, bears its staminate (male) and pistillate (female) flowers on different plants.

FIG. 8. NUTMEG.
Two twigs are shown; one bearing three clusters of male flowers, the other with ripe fruit. On the left is a detached flower, and a seed (the nutmeg) covered by its aril (the mace). (Reduced.)

In a short lived crop, this would be of comparatively small consequence, but to the nutmeg cultivator it is a most serious drawback. He raises perhaps, several hundred seedlings, plants them out, and waits patiently six or seven years for them to flower and 'declare themselves.' Two-thirds may possibly prove to be male. From these he will obtain no nutmegs, and the greater portion of the expense involved in raising and cultivating them is lost. Of course some male trees (about one in thirty) are necessary to pollinate the others and cause fruit to be set. It is very desirable that some practical method should be found of assuring the planter a certain number of female trees.

The most practical method of obtaining this end seemed to be by grafting. Careful attention was given to the question at the Hope Gardens, Jamaica, and in 1900 Mr. T. J. Harris succeeded in grafting selected female scions on to ten-months-old seedling stock. (*Annual Report*, Botanical Department, Jamaica, 1900; p. 6). In the Report for 1901 the Director states that seventy of the grafted plants have been grown on for planting out, and several have flowered and one fruited whilst still in the pots.

Similar experiments have been made in Ceylon, but with rather less successful results. In addition, in Ceylon, 'layering the branches of female trees has been attempted with fair success.' (*Annual Report*, Ceylon Botanic Gardens, 1901).

It remains now to be seen how the grafted or layered plants thrive under ordinary cultivation. The advantages to nutmeg planters, if Botanic Gardens can supply them with guaranteed female nutmeg plants are obvious, and future reports will be awaited with interest.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the IMPERIAL COMMISSIONER OF AGRICULTURE, Head Office : Barbados. It is particularly desired that no letters be addressed to any member of the staff by name. Such a course will entail delay in dealing with them.

Communications should always be written on one side only of the paper. It should be understood that no contributions or specimens will, in any case, be returned.

All applications for copies of the 'Agricultural News' should be addressed to the Local Agents and not to the Head Office. Where no Agents exist subscriptions at the rate of 3*s*. 3*d* per annum, payable beforehand, will be received at the Head Office.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News.

VOL. I. SATURDAY, JUNE 21, 1902. No. 5.

NOTES AND COMMENTS.

Botanical Adviser for the Colonies.

It has been announced in the *London Gazette* that Sir William T. Thiselton-Dyer, K.C.M.G., F.R.S., Director of the Royal Botanic Gardens, Kew, has been appointed Botanical Adviser to the Secretary-of-State for the Colonies.

Scientific Commission for St. Vincent.

Commenting on the Scientific Mission for the study of the recent Volcanic Phenomena in the West Indies, *Nature* says: 'The idea was mooted in conversation in the ante-room of the Royal Society at the last week's meeting and Dr. Tempest Anderson, who has probably examined and photographed volcanic phenomena in more regions than any other Englishman at once expressed his readiness to undertake the journey.' Fortunately it was found possible to arrange for Dr. Flett, the petrologist to the Geological Survey to come also.

The two members of the Commission will approach their subject from very different points of view. 'Dr. Anderson's wide experience as a traveller, especially in volcanic districts, with his skill as a photographer, and Dr. Flett's intimate knowledge of all sides of petrology, will insure, by their working in combination, that nothing will be missed and important accessions be made to our knowledge of vulcanology.'

Drs. Anderson and Flett arrived at Barbados, on the R.M.S. 'Trent' on Sunday the 8th. inst., and left by the mail of Monday for their destination.

What Our Rivals Are Doing.

Of late years the beet sugar industry in the United States of America has made extraordinary progress. In California during the last campaign the Oxnard factory produced 31,250 tons (2,000 lb. each) of sugar, and the Chino factory 12,500 tons, a total of 53,750 tons. These figures represent the output of only two factories. The average sugar crop of Barbados is about 51,000 tons, and of Antigua and St. Kitts together about 24,000 tons (2,240 lb.)

Tree Planting in Trinidad.

Trinidad supplies a good object lesson of the beneficial results of tree planting, a subject dwelt on in our issue of June 7 (pp. 50 and 55). In the *Annual Report* (for 1901) on the Botanic Gardens, Mr. Hart the Superintendent, says :—

'The trees in Jerningham Avenue continue to grow rapidly and the three years' growth since planting in March 1899, is more than could have been expected. . . . . The trees on the wharf have generally made good progress . . . . The Jubilee tree, planted by Sir C. C. Knollys, K.C.M.G., in 1897, is now over twenty-five feet high. It has a large spread of branches, is in excellent health and will probably make a handsome and permanent tree.

No one need therefore be debarred from planting trees on Arbor Day, through the fear of having to wait many years before obtaining tangible results.

Barbados Local Agricultural Show.

In 1901 and 1902 very successful local Agricultural Exhibitions, for peasant proprietors and small owners, were held in Barbados supported out of the funds of the Imperial Department of Agriculture (see also p.22.) On Friday the 6th. inst. a Committee meeting was held to make the preliminary arrangement for the show to be held on January 13, 1903, at Todds Plantation, St. Johns.

Seeds are being imported for free distribution to peasants and school children. In order to encourage an interest in plants at an early age, special prizes are offered to school children for plants grown in boxes, pots and small tubs. At the last show, notwithstanding the novelty of the subject, the school children exhibited some well-grown plants. Turners Hall School, of which Mr. C. T. Murphy is head master, gained a well deserved Diploma of merit in addition to the money prizes of the individual scholars.

Green Sorghum Poisoning.

Some recent research work in the Scientific Department of the Imperial Institute would appear to have afforded a solution to the vexed question of why cattle are sometimes poisoned by green sorghum, (*Sorghum vulgare,)* locally called Guinea corn.

Cattle frequently eat sorghum with impunity, but there is no doubt that at other times they suffer severely, death being not infrequent. Up to the present no satisfactory explanation has been given.

It would now appear that sorghum, in common with some other plants, contains prussic acid, the poison present in cassava (see *Agricultural News*, p. 5.) The poison occurs in the young plants, but gradually disappears as the seeds ripen. Obviously therefore, cattle should not be allowed to feed on young sorghum.

A Difficulty with Bois Immortel.

Mr. J. H. Hart of the Botanic Gardens, Trinidad, communicates the following extract from a letter, expressing a difficulty felt by some cultivators when an attempt is made to manure young cacao growing close to Bois Immortel :—

'El madre del cacao has many disadvantages. One of them, for instance, is that you *cannot think of manuring* your young supplies in an old cacao estate with Immortel near by. A month after instead of manure you will find a big sponge of Immortel roots strangling your poor little trees, which die, or do not grow at all.'

Growing Cacao from Cuttings.

Extensive experiments have been undertaken at the Ceylon Botanic Gardens to grow cacao trees from cuttings. The only successful cuttings have been in soil which is very sandy, practically free from all leaf mould and supplied with running water at irregular intervals. In one set of cuttings only those situated along the course of a small stream, and subject to occasional miniature floods, were successful. Of the cuttings tried only the woody ones about as thick as a man's finger were of any use.

Cacao in Ceylon.

The *Board of Trade Journal* extracts the following from the annual report of the Planters' Association of Ceylon :—

'The crop for the past year (1901), 47, 471 cwt., is the largest on record, and as a careful examination of the increase of acreage does not lead to the conclusion that this is to any appreciable extent caused by new land coming into bearing, it may be assumed that the increase is due largely to the recovery of estates from the attacks of canker and other pests, and that, agriculturally, cacao is in a sounder position than it has been for some years.'

Cassava Planting in the United States.

Our old friend the Cassava plant, hitherto almost exclusively grown in tropical countries, has lately attracted the attention of planters in the Southern United States. With the aid of suitable manures in the light soils of sub-tropical Florida and neighbouring States, cassava has yielded crops exceeding anything known in the West Indies. At a recent Sugar and Cassava Convention held at Brunswick, Georgia, the Hon'ble James Wilson, Secretary of the United States Department of Agriculture, delivered an interesting address on the possibilities of cassava cultivation in the south-eastern states. He laid stress on the fact that experiments had shown cassava to be a cheaper cattle food than corn and a more prolific crop than potatos. With this article as a sure crop, he did not see any reason why Georgia and Florida should not raise beef and pork, not only for their own consumption, but for the markets of the world. He also pointed out that cassava contains 80 per cent. of starch, and asserted that starch works would be found very profitable in the belt where cassava could be raised.

World's Production of Sugar.

The production of sugar in the world, in periods of ten years, is summarized in the following table quoted by the *Sugar Planters' Journal* from statistics published by the United States Department of Agriculture :—

Year.	*Cane Sugar, Tons.*	*Beet Sugar, Tons.*	*Supplied by Beet. Per cent.*
1840.....	1,100,000	50,000	4·35
1850.....	1,200,000	200,000	14·29
1860.....	1,510,000	389,000	20·43
1870.....	1,585,000	831,000	34·40
1880.....	1,852,000	1,402,000	43·08
1890.....	2,069,000	3,633,000	63·70
1900.....	2,850,000	5,950,000	67·71

The rapid strides the beet-sugar industry has made, as indicated in the last column, is most striking. In 1840 less than 5 per cent. of the sugar produced in the world was beet sugar. By 1870 it had risen to 34 per cent., and 1900, to close upon 68 per cent. Conversely, cane sugar, which in 1840 formed 95 per cent. of the world's production has steadily fallen, until to-day it forms only 32 per cent. of the whole.

Sweet Briar as a Goat Exterminator.

Sir W. T. Thiselton-Dyer, F.R.S., contributes the following interesting note to *Nature* for May 8, last :—

The introduction of the sweet briar into Australia, in many parts of which it is naturalized, affords a striking illustration of the mode in which the balance of nature may be disturbed in a wholly unforeseen way.

The fruit of the sweet briar consists of a fleshy receptacle lined with silky hairs which contain the seed-like carpels.

I extract from the *Agricultural Gazette of New South Wales*, Vol. XIII, No. 3, March, 1902, p. 313, the following note by Mr. E. A. Weston, a well-known veterinary surgeon of Launceston, Tasmania :—

'With reference to *Rosa rubiginosa*, I thought it might interest you to know that the hairy linings of the fruit caused the death of a number of goats here by forming hairy calculi, which mechanically occluded the lumen of the bowels. These goats were put on the land with the idea that they would eat down the briars and ultimately eradicate them, but the briars came out best and eradicated the goats. The cattle running on the land are also very fond of the briar berries, and from time to time one will die, and on the *post mortem* no pathological changes can be found in any of the organs, nor do the hairy calculi appear in them, although their various stomachs are one mass of the briar seeds.'

WEST INDIAN FISHERIES.

Tarpon in Jamaica.

We learn from Mr. W. Cradwick that the Holland ponds near Port Morant, Jamaica, contain abundance of very large tarpon. This locality possesses several attractions for the travelling sportsman. The United Fruit Company have now one of the nicest hotels in Jamaica on the top of Bowden Hill, commanding magnificent views of the sea and the Blue Mountains. Bowden is easily reached by land or sea. The 'Admiral' ships of the Fruit Company run from Port Antonio and Kingston right up to Bowden Wharf.

Tarpon is also said to occur in the mouths of most of the rivers on the south side of Jamaica.

DOMINICA.

The following announcements have recently appeared at Dominica in respect of the assistance offered to planters and others by the Agricultural Department:—

Agricultural Department.

FRESH VEGETABLE SEED of the following kinds can now be purchased at the Botanic Station:—Beans, Beet, Cabbage, Carrot, Celery, Cucumber, Egg-Plant, Khol-Rabi, Okra, Leeks, Lettuce, Musk Melon, Water Melon, Parsnip, Parsley, Pepper, Pumpkin, Radish, Squash, Tomato and Turnip.

CULTIVATION OF EARLY ONIONS.

THE Agricultural Department is prepared to again import a quantity of *White and Red Bermuda Onion Sets* from America for distribution at *cost price* to growers. These will arrive in time for planting in *October* next. Orders for sets should reach the Botanic Station not later than *June 15*.

The cost of White and Red Bermuda Onion sets is about *five dollars per bushel*, and six or seven bushels would be required to plant up an acre of land.

It must be distinctly understood that persons ordering are liable for the whole cost of their orders, and that the Botanical Department cannot be responsible in case the sets arrive in bad condition.

VANILLA CUTTINGS FOR SALE.

TWO or three thousand *VANILLA CUTTINGS* are now available at the Botanic Station at the price of *3s. per 100*. Persons wishing to purchase same should send in applications not later than the 31st instant. The cuttings available will be allotted, according to the demand, in fair proportions among applicants.

If landowners in this island are prepared to enter on the cultivation of vanilla on a mercantile scale, the Government will gladly consider the advisability of procuring the services of an expert to give practical instructions in the curing of the bean.

GRENADA.

Report of the Agricultural Instructor for April 1902.

During April Mr. McNeill, the Agricultural Instructor, has been engaged in visiting the experiment cacao plots in the out-districts of the island. A good deal of pruning and other work of a useful character was accomplished. The plots are described as 'promising', and the question of manuring them during the coming season is fully discussed. The plots are each divided into four sections—A., B., C. and D.—for manurial purposes (as described in the *Agricultural News*, page 51). So far the experiments in this direction have chiefly taken the form of an application of pen manure to section A., and basic slag at the rate of 4 cwt. per acre, to sections B., C. and D., followed, respectively, by small top dressings of nitrate of soda, sulphate of ammonia and sulphate of potash at the rate of 1½ cwt. per acre. It is proposed to repeat the experiments this year.

The chief object of experiment plots being to illustrate the best methods of renovating old and neglected cacao trees, it was decided to relinquish the plot at Gouyave estate where the trees have been brought to excellent condition and required no further attention from the Department. For other reasons it was considered undesirable to continue the maintenance of the Chantimelle plot. It is proposed to select other suitable plots as soon as possible. The Report concludes with suggestions for establishing experiment plots of pine-apples and grapes on the Leeward side of the island.

ST. LUCIA.

Agricultural Notes.

Mr. George S. Hudson, the Agricultural Instructor has contributed the following notes:—

Weather—The drought was broken on May 24, by three days of heavy and continuous rainfall, measuring from 8 inches in the driest districts to 27 inches in the mountains. Some damage has been done to bridges, roads, and cacao plantations on the river flats, but few landslips occurred.

Cacao—We are now in a position to form some idea of the prospects of the coming cacao crop. The conditions are almost identical with those of last year. The trees are flowering heavily, but they are also throwing out new foliage to replace that lost during the drought, and we know that the two processes of leaf and fruit production cannot proceed coincidently with equal success. The formation of flowers and their fertilization is not in itself a great call on the strength of the tree, the drain commences when several hundred pods on one tree attain the length of about an inch; at this stage the greater number begin to turn yellow and die off. With a view to obviate this we, last year, tried the following experiment at the Government Cacao Plot, Soufriere. 1 ton of sheep manure together with 1½ cwt. of sulphate of ammonia per acre was supplied to the trees in June, when every branch was crowded with young pods and flowers. The stimulating effect of this application was visible within a week, but it all went to the production of foliage and 'gormandisers,' and the young pods turned black on the trees by hundreds, while the foliage showed that dark vigorous green shade, which our labourers here expressively call 'blue.' The experiment was a failure in the sense intended. This year we are trying again, at the same period, with 2 cwt.

of sulphate of potash per acre divided into two applications with a months' interval between.

Mr. William Low, late Colonial Secretary at the Gold Coast, and sometime Administrator of Tobago, has on retiring from official life purchased the valuable cacao property of 'Union Vale,' at Soufriere. The addition, to the ranks of St. Lucia planters, of a gentleman of Mr. Low's calibre, cannot fail to be valuable. Mr. Low is making extensive and interesting experiments in the artificial manuring of his cacao, under the advice of the Imperial Department of Agriculture.

INSECT NOTES.

Screw Worm in Cattle.

ST. LUCIA.

We are indebted to Mr. H. Dulien, Manager of the Marquis estate, St. Lucia, for a very interesting summary of some experiments he has recently carried out on the life-history and mode of treatment of this pest.

The general result of his observations is to confirm the value of the recommendations given in the pamphlet, issued by the Department, on *Screw Worm in Cattle at St. Lucia*. He states that he finds crude carbolic acid an effective agent in killing the maggots, and by washing the wound with it daily, the flies are prevented from laying eggs, and so causing the sore to break out afresh.

TREATMENT AT CURACOA.

The Secretary of the Society for the promotion of Agriculture in Curaçoa (Dutch West Indies) writes:—

Having noticed with much interest the pamphlet on the *Screw Worm at St. Lucia*, we can inform you that this pest is treated here very successfully by the use of 'Battle's (liquid) Sheep Dip' (Battle, Maltby & Bower, Lincoln), one dressing being usually sufficient to destroy the worms entirely. Some planters here also use a mixture of carbolic acid (1 part) and sweet oil (8 parts) but this is not as efficient as the 'Sheep Dip,' although very good.

Wing-covers. Beetles are distinguished from other insects by the possession of a pair of wing-covers. These are in reality the first pair of wings, hardened and modified to cover the upper surface of the body and protect the second pair of wings below. These wing-covers probably have a very important function in flight. This can be seen in the 'hardback' beetle, in which these wing-covers are held during flight at an angle to the body and serve as balancers and also as a sort of parachute in descending. If these are cut off, it is found that the beetle can fly but cannot descend properly; deprived of his wing-covers, he invariably falls on his back or head and is unable to come down on his legs as he would were the large wing-covers in position above him. They serve to steady him and bring him down right side up, and so have a double function.

VOLCANIC DUST.

COMPARATIVE RESULTS OF ANALYSES.

Professor P. Carmody has kindly forwarded to the Department the following comparative analyses of three samples of volcanic dust. The first was collected at sea off St. Vincent by Captain Edwards of the s. s. 'Louisianian,' the second was collected by Dr. Morris at Barbados, and the third was a specimen of the dust ejected by Mt. Pelee at Martinique:—

	s.s. *Louisianian.*	*Barbados.*	*Martinique.*
Soluble in water:—			
Chlorine	0·05%	0·09%	0·05%
Potash	trace	trace	trace
Soda	"	" (large)	" (large)
Lime	" (large)	" (large)	" (large)
Sulphates	" (large)	" (large)	trace
Total	0·45%	0·45%	0·30%
Soluble in Acids:—(Two hours)			
Iron oxide as FeO	5·60%	5·01%	3·59%
Silica, Alumina, etc.	11·81	6·89	2·01
Lime	2·94	3·36	1·13
Magnesia	trace	·40	·22
Potash	...	·05	·05
Soda	...	·44	·22
Sulphates	traces	·23	·02
Phosphates	traces	traces	·11
Total	20·35%	16·38%	7·35%
Insoluble in Acids			
Silica and silicates of iron, lime, etc.	78·10%	83·30%	92·23%
Loss on ignition	·50	·40	·40
	99·40%	100·53%	100·28%
The 'insoluble in acids' was fused and found then to consist of			
Silica	42·90	48·48	59·80
Iron silicates etc.	28·35	31·57	27·73
Lime	6·85	3·25	4·70
	78·10%	83·30%	92·23%

FINENESS.

The following proportions remained on sieves of the following sizes:—

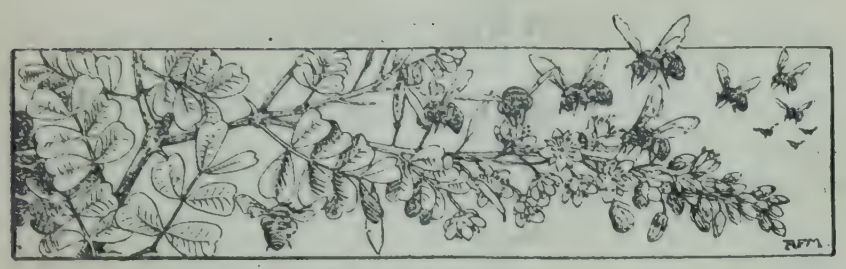
Meshes per inch.	s.s. *Louisianian.*	*Barbados.*	*Martinique.*
30	nil %	nil	2 %
40	nil "	1 %	12 "
50	1 "	1 "	10 "
60	3 "	2 "	7 "
70	7 "	6 "	11 "
80	28 "	41 "	8 "
90	25 "	12 "	7 "
100	10 "	6 "	4 "
Passed through 100	26 "	31 "	39 "

REMARKS.—There is practically the same amount soluble in water and volatile on heating in all three samples.

The proportion soluble in acids differs very considerably. The amount of lime is greatest in the dust of lowest specific gravity.

As regards fineness, the St. Pierre dust contains, as might be expected, coarser particles than the other two.

The St. Pierre dust contains a reddish mineral in the form of short cylinders which is not present in the other two, and there is also a slight difference when viewed by polarized light.



BEE-KEEPING.

Antigua.

Mr. W. N. Sands, Curator of the Botanic Station, writes :—

Owing to the wet season bee-keepers in Antigua have not had such good returns of honey as usual.

The log-wood from which early supplies are chiefly obtained did not come into full flower until April, whereas in normal seasons the honey from this source usually commences in February.

Other honey such as genip *(Melicocca bijuga)* is now coming in, but as the bees have started swarming not much store is being put up.

At the Botanic Station, queens are being raised from imported Italian queens, by the Doolittle plan of queen-cell grafting, for sale to the local bee-keepers. This method has already been successfully tried and the Station apiary re-stocked with young hybrid queens.

Sea-side grape. The sea-side grape *(Coccoloba uvifera)* is a common shore plant in the West Indies. The leaves of this tree are interesting. They are very tough and leathery, and point obliquely upwards to the sky. Both the tough leaf and the edgewise position are adaptations on the part of the plant to prevent drying up. All shore plants have a difficulty in taking up water from the soil in which they grow, and thus have to adapt themselves to get on with the minimum quantity. The sea-side grape is of especial interest to bee-keepers. At certain seasons of the year it puts out long sprays of small white flowers, succeeded later by the purplish more or less astringent 'grapes.' These flowers furnish a good supply of honey to the bees of good flavour and light colour.

POULTRY.

Ticks on Fowls.

Mr. C. W. Meaden recently forwarded to the Department a piece of skin, removed from a fowl's breast, covered with ticks. He stated that the whole body of the fowl was covered with these parasites which had eventually killed the bird. Continuing he added :—

The life history is fairly well known, but not sufficiently amongst those who rear our market poultry. The individual fowl under view was purchased with others from a market woman in the street, and she informed me that the birds came from Tobago. They had just been landed. Four out of the dozen fowls bought were killed by this tick. They were allowed to do so as an experiment to see the extent of injury the ticks were capable of doing. The other fowls were dressed with Jeyes Fluid and oil, and the ticks were destroyed. The house they inhabited was burnt.

This particular tick is, I am sure, the cause of considerable loss in poultry.

Best Breeds of Fowls.

The following extract is taken from an interesting article by Mr. W. B. Tegetmeier in *The Country* for April, last :—

The question may therefore be asked by those who keep poultry for practical and useful purposes, what breeds shall we employ, and what system of keeping shall we pursue? If eggs are the chief desiderata, the best breeds to adopt are those which do not incubate, such as those known at the present time as Minorcas, Leghorns, Andalusians, and Hamburghs. Of these, the two former are unquestionably the best, inasmuch as they lay the largest eggs. But the system pursued varies greatly, as do the conditions under which the fowls are kept. It is almost needless to say that the most advantageous method of keeping fowls is in localities where they have an extended range, finding for themselves a great portion of their natural food—worms, insects, seeds and herbage of various kinds. Under these conditions, fowls only require a clean roosting-house and feeding twice a day to yield a good supply of new-laid eggs, provided the hens are kept for two years and not beyond that time, as the second year's laying exhausts the great prolificacy of any hen, when her services should be at once transferred to the stock pot.

Ground Pumpkin-Seeds for Fowls.

'Fowls are very fond of cucumber and rock-melon seeds, and young cockerels will eat them in preference to wheat. They also are partial to pumpkin-seeds broken up small. Where cows are fed on pumpkins there are always large quantities of seed, which are not fed to cattle. These, if cracked small, would form a valuable food for poultry. Those who have tried it say it increases the fertility of laying hens.' *Queensland Agricultural Journal*, Vol. VIII., p. 36).

A Double Tragedy.

Down from a twig on a Northern Spy tree
A canker-worm swung in security ;
He'd eaten all season since first he was hatched,
As a ravenous glutton he couldn't be matched.
He slipped inch by inch to the grass-covered ground.
Where he thought safe concealment might surely be found,
In which he could pupate till autumn set in ;
But a hen came that way and she gathered him in.
Gathered—gathered—gathered—she gathered him in.

She gathered him in, and his final rest
Was there, in there, in her well-filled chest ;
And she strolled around in search for more,
For it tasted better than aught before.
But I thought of her end, her final act
When the farmer 'd slice with a carver's tact,
And remark, as each piece made him look less thin,
'I gather her in, I gather her in,
Gather—gather—gather—I gather her in.'

American Agriculturist.

EDUCATIONAL.

Jamaica.

AGRICULTURAL INSTRUCTION TO TEACHERS.

At the West Indian Agricultural Conference in January last, an interesting account was given of the courses of practical instruction to teachers already in charge of schools carried on in connexion with the Mico Training College. This account will appear in the forthcoming number of the *West Indian Bulletin*, ready early next month. The Jamaica *Daily Gleaner*, of May 27, contains the following letter from the Hon. T. Capper, Superintending Inspector of Schools relative to a proposed course in July and August next:—

A course of Agricultural Instruction similar to that given at the Mico Institution last July will be again given at the same place between July 21 and August 15 next, inclusive.

The teachers attending the course will be boarded and lodged gratuitously at the College; but no allowance will be made for travelling expenses. The sum of three shillings (3*s*.) will be charged in each case for laundry.

Teachers who wish to join the course are requested, after obtaining the sanction of their managers, and ascertaining that suitable arrangements can be made in accordance with Article 123a of the New Code with regard to the working of their schools to apply to the Department on or before Saturday, June 14. Each teacher who applies will be informed on or before June 30, whether he or she has been selected.

Careful study of the agricultural part of the *Tropical Readers* is strongly recommended to all teachers applying for leave to attend the course.

A deficiency of not more than twenty Sessions will be excused in the case of schools whose teachers have been selected and have attended this course during the school year, if the written explanation required by Article 97 is handed in to the Inspector at the inspection showing why it was impossible to make temporary arrangements for keeping the school open.

In case a teacher who has applied for admission to the course and has been selected withdraws without either giving a reason satisfactory to the Department or giving notice previous to July 14, the Department reserves the right to deduct a fine, not exceeding 10*s*., from the Merit Grant to his school. Arrangements will, as far as possible, be made to prevent the inspection of any school whose teacher is attending the course taking place just after, or during the course.

Composition of Arrowroot.

The *Journal of the Chemical Society* for May records the following analysis of arrowroot rhizomes from Jamaica:—

Water	...	...	63·42	per cent.
Starch	...	...	27·84	„ „
Dextrin and Sugar	...	...	2·08	„ „
Crude fibre	...	...	3·94	„ „
Ether extract	...	...	0·19	„ „
Proteid	...	...	1·64	„ „
Ash	...	...	0·89	„ „

The ash consists chiefly of phosphoric acid and potassium carbonate. The pulped root, when steam distilled, yields a volatile oil.

SCIENCE NOTES.

Plant Pathology.

The following extract from a paper by Dr. Erwin F. Smith of the United States Department of Agriculture entitled 'Plant pathology: a retrospect and prospect' is of interest both to planters and to others who are brought in contact with plant diseases:—

Some words finally as to the future. The prophet is always at the mercy of events. Nevertheless I shall venture a few predictions. First of all, we may predict for plant pathology in the United States during the next fifty years a wonderful development, since it appeals very strongly to the genius of our people. This being taken for granted, how shall that development be best facilitated? The facts which lie on the surface of things, as regards both the causes of disease and the treatment of the same, have now been pretty well picked up. In my judgement, the treatment of diseases by spraying with copper fungicides has reached its climax and is now on the wane. We shall have to devise other methods for dealing with many plant diseases. Plant breeding is one of the most hopeful. It is a slow process, and the man in the field will sometimes become impatient unless he is a philosopher as well as a farmer. *Field hygiene is also a matter of prime importance. Suitable rotation of crops must also be practised, and as far as possible diseased material, and the carriers of such material, must be destroyed.* I lay much stress upon the last statement. Insects in particular are responsible for much more than the direct damage they cause. [*Science*, Vol. XV., No. 381, p. 609].

Gum Fermentation of Sugar-Cane Juice.

The *Sugar Journal* for December 15, 1901, publishes an abstract of a paper on this subject contributed to the Linnean Society of New South Wales, by Mr. R. Greig Smith. M.Sc, Macleay Bacteriologist to the Society. The viscosity which occasionally develops in cane juice during the manufacture of sugar is stated to have been traced to bacterial action, the active organism being a new species, *Bacillus levaniformans*. This bacillus is said to bring about the fermentation of sucrose, producing gum, a mixture of reducing sugars, carbon dioxide and various acids. The gum 'which is probably the diffluent capsule of the bacillus' has been named 'levan.'

Mr. Greig's paper was followed by one by Mr. Thos. Steel, F.L.S., F.C.S., who described the chemical properties of the gum, 'which differs in important respects from inulin, the body which it most nearly resembles.' Levan is said to be quite distinct from the gum produced in the well-known 'gumming' disease of the sugar-cane. The determination of the nature of the gum sometimes found in sugar-cane juice in the West Indies was amongst the subjects discussed at the Chemical Section of the last Agricultural Conference. (See *West Indian Bulletin*, Vol. III, p. 97.)

An Inch of Rain. What does an inch of rain mean? Few persons have a definite idea. An acre, if calculated out, will prove to be 6,272,640 square inches. An inch deep of water on this area will be as many cubic inches of water, which, at 231 to the gallon, is equal to 27,154 gallons. This immense quantity of water will weigh 228,190 lb or 114 tons. One hundredth of an inch (·01) alone is equal to over one ton of water to the acre (*Queensland Agricultural Journal*, February 1901.)

AGRICULTURAL SOCIETIES.

Dominica.

Mr. A. K. Agar, the Hon. Secretary, has contributed the following account of the special meeting of the Society called in connexion with the visit of the Hon. Francis Watts, the Government Chemist, to the Presidency:—

A special general meeting of this Society was held at the Court House, Roseau, at 8.30 p.m. on Saturday, May 24, to hear an Address by the Hon. Francis Watts.

The President, his Honour the Administrator, presided, and a fair number of members attended.

Mr. Watts first spoke on the subject of Citrate of Lime, a practical demonstration of the making of which he had given in the morning at the Bath Estate.

After having gone very thoroughly into this, Mr. Watts gave the meeting a *résumé* of the results of a series of analyses he had made of the soils of the island, particularly from a physical point of view, and produced a series of photographs of the soils as analysed. In every case the soils, although taken from widely separated districts, were found to be eminently suited, physically, for the cultivation of all tropical products, while very few were deficient, chemically, in anything necessary to plant life, and then only in a slight degree. From what the lecturer said, it appeared that the soils of Dominica are practically uniformly fertile.

At the conclusion of the Address a few questions were asked by the members, and the meeting rose at about 10.30 p.m.

St. Lucia.

At the May monthly meeting of the Soufriere Agricultural Branch, when about thirty planters were present, the Agricultural Instructor read a short paper on Cacao pruning, followed by an adjournment to a neighbouring cacao plantation, where a practical demonstration in pruning was given. An interesting discussion followed. Mr. A. F. Palmer, the Magistrate of the district, occupied the chair.

On May 4 at Choiseul a Public Meeting was held with a view to interesting small proprietors in the work being done by the Agricultural Society and the Imperial Department of Agriculture. The meeting was largely attended, about 250 persons being present. The Agricultural Instructor occupied the chair. All speeches were in 'patois' and the audience was very sympathetic. It may safely be assumed that in consequence of this meeting, the membership of the Choiseul Branch of the Agricultural Society will be largely increased, and that the peasantry will take more interest in the various schemes now on foot to benefit them.

A small library of suitable agricultural literature is being attached to each of the local branches of the Agricultural Society.

Insects with wings. It is not generally known that insects that have once grown their wings never develop any further. An insect that is found to have perfect wings never grows any more and will not develop into a larger insect or undergo any change. Not all insects have wings, but when they do, they are at the last period of their lives. This period may be very short as in many flies, moths, butterflies, etc., or may last a long time as in many beetles, bees, wasps, etc., but, inevitably, sooner or later the life of the insect in the winged stage closes without further development.

DEPARTMENT NEWS.

The Commissioner of Agriculture for the West Indies left Barbados by the mail of the 9th instant for the Northern Islands. Dr. Morris proposed to spend the greater portion of the available time in Antigua where several important matters demand his presence, visiting St. Kitts if opportunity serves, and to return to the Head Office by the mail reaching Barbados on Saturday, June 21. The Commissioner was accompanied by Mr. B. Mason, one of the clerks of the Department.

Mr. David Tannock, Officer-in-charge of the Agricultural School, Dominica, has been granted three months vacation leave and twenty-five days leave of absence from July 3.

The Report on the Experiment Stations at Montserrat, for 1900 to 1901 has recently been issued. It briefly summarizes the work done since the starting of the stations in 1900. The progress made is, on the whole, very favourable, in spite of an exceptional drought which seriously interfered with the success of much of the experiment work.

Number 16 of the Pamphlet Series entitled *Hints on Onion cultivation* has been published. It contains the substance of an address delivered by his Honour the Commissioner of Montserrat to small owners in that island. The results of the early experiments of the Imperial Department of Agriculture are described, and simple and practical hints given on the cultivation, and harvesting of the crop. Any grower who is desirous of exporting onions should pay special attention to the section on 'packing and shipping.' The pamphlet may be obtained from all the local agents of the Department. Price 2*d*.

Sprouting English Potatos harmful.

'Cases of actual poisoning by potatos are by no means unknown. So far as can be learned the abnormal symptoms in such cases were caused by the presence of solanin in the potatos. Several years ago 357 soldiers in a battalion of the Austrian army showed symptoms of solanin poisoning. The potatos used for food were examined. Those which were fresh contained a small amount of solanin, while those which had sprouted contained much more, still larger amounts being found in the sprouts than in the tubers themselves. The potatos undoubtedly caused the poisoning in this case. Potatos a year old which have lain in a cellar and shrivelled, and small potatos which have sprouted without being planted are considered especially dangerous, and should not be eaten. If perfectly fresh potatos contain any solanin, the amount is so small that it does not cause harm.' (*Year Book*, U. S. Depart. of Agriculture, for 1900, p. 348).

Sweet Potatos in Tobago. Among the numerous kinds of sweet potatos cultivated in Tobago, those known locally as 'Antigua,' and' Cuffir' are the best. In addition to the food value of the root, the vines form an excellent fodder for cattle and stock.

TRINIDAD. ANNUAL REPORT ON THE ROYAL BOTANIC GARDENS 1901-2 By J. H. Hart, F.L.S., Superintendent.

The larger portion of this report is devoted to notes on the interesting experiments with economic plants, conducted in continuation of the work of former years Of the rubber plants under trial, Central American, Para, and Lagos silk rubber continue to thrive. Ceara rubber although making little progress at the Station is reported to be doing well in other parts of the Colony. Experiments are in hand to determine the best age for tapping Balata trees. The present importance of the camphor industry has not been overlooked, and some specimens of camphor prepared at the Station, probably the first on record of West Indian manufacture, were exhibited at the Agricultural Conference, of January last.

Fruit and coffee cultivation have, as usual, claimed a considerable share of Mr. Hart's attention. Some of the results of the experiments with coffee have already been noted in this Journal (pp. 6 and 54). The more important experiments with fruit trees will be dealt with separately later.

During the year considerable progress has been made with the St. Clair Experiment Station, taken over in 1898 for experiments with economic plants, and nursery work. Over 23,000 plants were sold, and 97,000, including cane cuttings, distributed free, making a grand total for the year of 120,000. In addition a very large quantity of seed was distributed. The nursery stock at present is about 35,000 plants. Agricultural education has not been neglected and it is pleasing to note that provision is made on the estimates for 1902-3 for two Agricultural Instructors in Trinidad.

From the meterological returns it appears that the mean temperature for the year was 78·6°, and the total rainfall 58·16, more than ten inches below the mean of the last fourteen years.

CEYLON. ANNUAL REPORT ON THE ROYAL BOTANIC GARDENS, 1901. By J. C. Willis, M.A., F.L.S., Director.

This report gives an account of the very valuable work being carried on in these gardens. In addition to the large amount of economic work, due attention is being paid to accurate scientific research. The Director rightly says, 'Successful practical applications of science must be based upon thorough scientific investigations; such work is laborious and needs long periods of time, and it is of the greatest importance that the scientific officers should have the greater portion of their time at their disposal for such work.' A new Scientific Journal, The *Annals of the Royal Botanic Gardens, Peradeniya*, has been started and two numbers have been issued during the year. There is a supplement to the *Annals* devoted to a *résumé* of the chief facts of importance about all the known economic products of the island. Provision is made at Peradeniya for the laboratory investigations of the scientific staff and of foreign visitors desirous of working at tropical botany. Several distinguished botanists conducted investigations at the laboratory during 1901. As a necessary outcome of the experiment work, done on a small scale at the Gardens, steps are being taken to establish an experiment station where large scale trials of economic plants can be made as well as experiments on different modes of cultivation, the treatment of disease, the preparation of products for market and their actual sale upon the open market. The cultivation of rubber seems to be a success in Ceylon. The production of citronella oil is hardly satisfactory on account of adulteration and over-production, the price realized being far below that obtained in Java where adulteration is not practised. The work of the Mycologist and Entomologist has been much appreciated. Much of their time has been taken up in visiting estates and giving advice to planters, personally and by letter. Steps are taken to fumigate all Wardian cases which arrive at the Gardens and a fumigatorium is being established at Colombo, the port of entry. Valuable experiments have been made in grafting coffee, cacao, nutmegs and mangos, while attempts have been made to grow cacao from cuttings. The results of some of these experiments will be given in the *Agricultural News* in the form of short notes. Swedes have been successfully grown at the Hakgala garden (about 6,000 feet elevation). The cost of the Ceylon Botanic Department is £4,800 a year, so that the Colony is to be congratulated on the result of this expenditure.

CEYLON. ANNUAL REPORT OF THE GOVERNMENT MYCOLOGIST, 1901. Circular No. 1, Vol. II of the Royal Botanic Gardens, April 1902.

It is reported that the canker and pod diseases of cacao are on the decrease on account of the measures adopted by the planters to check these pests. The difficulty of dealing with diseased specimens, when these are quite inadequate in amount, and are unaccompanied by any information as to soil, situation and previous history of the plant is referred to. 'The task of making recommendations for treatment is then somewhat similar to that of a doctor called upon to examine a portion of a dead or dying man without any facts about the case and asked to recommend a course of treatment.' The leaf and root diseases of tea and the distribution of the spores of the fungus causing the former have been investigated. These spore distribution experiments were conducted in co-operation with the managers of estates who appear to have taken a keen interest in the work. The finger-and-toe disease of cabbages and turnips, caused by the 'slime fungus' *Plasmodiophora*, has made its appearance in Ceylon. A fungus has been noted growing on commercial samples of Para rubber. Extensive measurements of cacao pods have been made in order to determine whether any external characters of the pod can be used for selection of seed. It was found that the external shape and size of the fruit affords no criterion as to the commercial value of the seed within and may often be a most misleading character. Some attention has been devoted to the pollination of cacao, and, so far, only one insect, an aphis, has been found bearing pollen grains. Cacao seed has been sent to distant parts of the British Empire with a view of discovering the length of time that the seed will retain its vitality under varying conditions.

COMMERCIAL INQUIRIES IN THE WEST INDIES.

The following is a complete list of officers designated up to the present in the West Indies to undertake the duties of receiving and answering commercial inquiries which may be addressed to them either by the Commercial Intelligence Branch of the Board of Trade, or by Merchants and British traders who may seek advice :—

Bahamas...The Colonial Secretary, Nassau.

Barbados...The Colonial Secretary, Bridgetown.

British Guiana...The Controller of Customs, Georgetown.

British Honduras...The Colonial Secretary, Belize.

Grenada...The Controller of Customs, Grenada.

Jamaica...The Colonial Secretary, Kingston.

Leeward Islands...The Treasurer, Antigua.

St. Lucia...The Administrator, St. Lucia.

St. Vincent...The Supervisor of Customs, St. Vincent.

Trinidad...The Collector of Customs, Trinidad.

It is suggested, that, in all cases commercial inquiries should go through the Commercial Intelligence Branch of the Board of Trade, 50, Parliament St., London, S.W., as the information required may sometimes be already available at that Branch.—[*Board of Trade Journal*, April 3, 1902.]

HAND-BOOKS TO THE WEST INDIES.

The following Hand-books afford interesting information of a descriptive, statistical and general character respecting the West Indies. They also contain particulars respecting the imports and exports and the agricultural resources of the Colonies enumerated :—

Hand-Book of Jamaica for 1902, comprising Historical, Statistical and General Information concerning the Island. Twenty-second year of publication. London : Edward Stanford, 26 and 27 Cockspur Street. Jamaica : Government Printing Office, Kingston.

British Guiana Directory and Almanack for 1902. Georgetown, Demerara : C. K. Jardine.

Trinidad and Tobago Year Book, 1902. Thirty-seventh year of issue. Compiled by James Henry Collens. Port-of-Spain : Muir, Marshall & Co.

The Mirror Almanack and General Commercial Directory of Trinidad and Tobago. Port-of-Spain : Mole Brothers.

The Grenada Hand-book, Directory and Almanack for the year 1902. Compiled by the Colonial Secretary. London : Sampson Low, Marston & Co., Ltd.

The St. Lucia Hand-book, Directory, and Almanac for 1902. Compiled by Everard G. Garraway, Castries, 1902.

The Barbados Directory and West Indian General Advertiser, 1901. Compiled by S. J. Fraser. Bridgetown Barbados : King & Co.

Lightbourn's West Indian Directory and Commercial Directory. J. N. Lightbourn, St. Thomas.

AGRICULTURAL INSTITUTIONS IN THE WEST INDIES.

Jamaica Board of Agriculture : *Chairman* : The Hon'ble Sydney Olivier, C.M.G.; *Secretary* : W. R. Buttenshaw, M. A., B.Sc. ; *Publication*—Occasional Bulletin.

Jamaica Agricultural Society (with thirty two affiliated Branches). Kingston, Jamaica. *President* : Sir Augustus W.L. Hemming, G.C.M.G. *Deputy Chairman* : Hon'ble Wm. Fawcett, B.Sc., F.L.S. *Secretary* : John Barclay. *Publication* : "Journal of the Jamaica Agricultural Society."

Royal Jamaica Society of Agriculture & Commerce & Merchants' Exchange, Kingston, Jamaica. *President* : Hon'ble Lieut-Colonel Ward, C.M.G. *Secretary* : J. L. Ashenheim. *Publication* : Annual Report.

The Institute of Jamaica : Kingston, Jamaica. *Chairman* : Sir Fielding Clarke. *Secretary* : Frank Cundall, F.S.A., *Curator of Museum* : E.S. Panton *Publications* "Journal of the Institute of Jamaica." "Jamaica in 1901."

Kingston & St. Andrew Horticultural Society. Kingston, Jamaica. *President* : Hon'ble Wm. Fawcett, B.Sc. *Secretary* : William Harris, F.L.S.

British Guiana Board of Agriculture, Georgetown, Demerara. *Chairman* : Hon'ble A.M. Ashmore, C.M.G. *Deputy Chairman* : J. B. Harrison, M.A., C.M.G., ; *Secretary :* Oscar Weber : *Agricultural Instructor :* R. Ward : *Assistant Instructor in Agriculture :* J. E. Beckett (on probation) ; *Veterinary Surgeon* : J. A. Raleigh.

British Guiana Royal Agricultural & Commercial Society Georgetown, Demerara. *President* : Luke M. Hill, B.A., M.I.C.E. *Secretary* : Thomas Daley. *Local Secretary* : (Berbice,) Dr. C. F. Castor. *Assistant Secretary and Librarian* : J. Rodway, F.L.S.. *Curator of Museum* : Richard Evans, M.A., B.Sc., *Publication* : "Journal of the Royal Agriculture and Commercial Society of British Guiana."

Trinidad Agricultural Society, Port-of-Spain, Trinidad. *President* : Sir Alfred Moloney, K.C.M.G. *Secretary* : Edgar Tripp. *Publication* : "Proceedings of the Agricultural Society of Trinidad."

Grenada Agricultural Society, St George's, Grenada. *President* : Sir Robert B. Llewelyn, K.C.M.G. *Secretary :* W. E. Broadway. *Publication* : Minutes of Meetings.

Barbados General Agricultural Society & Reid School of Practical Chemistry, Bridgetown, Barbados. *President* : Sir. George C. Pile, Kt. *Secretary* : J. H. Poyer. *Publication* : "Barbados Agricultural Gazette and Planters' Journal."

St. Lucia Agricultural Society, Castries, St. Lucia : *President* :————*Secretary* : R. G. McHugh.

Dominica Agricultural Society, Roseau, Dominica. *President* : The Hon'ble H. Hesketh Bell. *Secretary* : A. K. Agar.

Antigua Agricultural Society. *President*———— *Secretary* : W. N. Sands.

St. Kitts-Nevis Agricultural Society. *President :* Honourable E. G. Todd. *Secretary :* C. A Smith.

[Further particulars of Agricultural and Horticultural Institutions in the West Indies would be gladly received for this list. Also fixtures for Agricultural Shows for 1902.]

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is desirable that inquiry be made, beforehand, as to the terms on which such produce will be received, and whether the market is favourable or not.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—
B. S. Bayley, Water Street Georgetown.

TRINIDAD—
J. Russell Murray, Port-of-Spain.

BARBADOS—
T. S. Garraway & Co., Bridgetown.

ST. LUCIA—
Captain H. Henville, Contractor and Agent, Castries.

MARKET REPORTS.

London,—May 27, 1902.—Messrs. J. Hales Caird & Co., and Messrs. Gillespie Bros. & Co.

Bees-wax—Jamaica, £7. 15. to £8. per cwt.
Cacao—Trinidad, middling to good 62/- to 64/- ; good to fine red, 65/- to 67/- per cwt.
Grenada, fair mixed to fine red, 55/- to 60/6 per cwt.
Jamaica, fair 50/- to 54/6 per cwt.
Dominica, fair to fine red 56/- to 59/- per cwt. 53/- to 54/6.
Coffee—Jamaica, good ordinary 30/- to 37/-; good bold 59/6 per cwt.
Costa Rica, smalls 43/- to 50/3 ; bold 73/- to 93/- per cwt.
Peaberry 63/- to 80/6 per cwt.
Cotton—Carriacou, $5\frac{1}{16}$c. per lb.
Ginger—Jamaica, good bold bright 50/6 to 55/- ; common 36/6 to 37/6 per cwt.
Honey—Jamaica, bright clear amber 18/ to 18/6, dark 14/6 to 15/- per cwt.
Lime Juice—Raw, 1/- to 1/2*d* per gallon. Concentrated, £12. per pipe.
Mace—good red, 1/2 to 1/5 ; good to fine pale 1/6 to 2/6 per lb.
Nutmegs—Shelled, no auctions. In shell 5*d* to $6\frac{1}{2}d$ per lb.
Oil of Limes—Distilled 1/6 per lb. Hand pressed 4/ per lb.
Pimento—$2\frac{7}{8}d$. per lb.
Sarsaparilla—Jamaica, fair 1/2, native red, $10\frac{1}{2}d$ to $11\frac{1}{2}d$. per lb.
Sugar—Barbados Muscovado 12/9, Crystallized 13/6 to $14/4\frac{1}{2}$ per cwt.
Tamarinds—Quiet. Barbados 11/ per cwt. in bond.
Logwood—Jamaica quiet.
Fustic—Jamaica £4. 15/- per ton.
Fruit—Covent Garden Market (Gardener's Chronicle, May 3rd. 1902.)
Bananas—7/- to 10/- per bunch.
Lemons—6/- per case.
Mangos 6/- per dozen.
Oranges—16/- to 20/- per case.
Pines—3/- to 4/- each.

New York,—May 16, 1902.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaica, 9 hands $1.20 to $1.25, 8 hands 80c. to 90c., 7 hands 45c. to 50c. per bunch.
Cacao—African $12\frac{3}{4}$c., to 13c. Caracas. fair to good ordinary $14\frac{1}{4}$c. to 15c. Jamaica, good fermented $11\frac{3}{4}$c. Grenada 13c., Trinidad 13c. to 14c. per lb.
Cocoa-nuts—Jamaicas, $20.00 per M. Small Trinidads $12.00 per M.
Coffee—Rio, good ordinary $5\frac{1}{2}$c. Jamaica ordinary $5\frac{3}{4}$c. to 6c., and good ordinary $6\frac{3}{4}$c. per lb.
Ginger—8c. to $8\frac{1}{2}$c per lb.
Pimento—$5\frac{3}{4}$c. to 6c. per lb.
Rubber—Nicaragua Scrap $51\frac{1}{2}$c. to 52c. per lb, sheet 46c. to 47c. per lb. Guayaquil Strip 49c. per lb.
Sugar—Muscovado, 89°, $2\frac{5}{8}$c. to 3c. Centrifugals 96°, $3\frac{1}{2}$c per lb.

INTER-COLONIAL MARKETS.

Antigua,—June 4, 1902.—Messrs. G. W. Bennett, Bryson & Co., Ltd.

Molasses—8c. per gallon, package included.
Sugar—Muscovado $1.10 per 100lb., nominal.

Barbados,—June 7, 1902.—Messrs. T. S. Garraway & Co.

Arrowroot—good quality, $3.50 per cwt.
Cacao—$13.50 per cwt.
Coffee—Jamaica and ordinary Rio $10.50 and $9.50, respectively.
Eschalottes—12c. to 14c per lb.
Hay—lotting $1.75 per 100lb.
Molasses—8c. per gallon and $4.00 for package.
Onions—Bermuda $2.25 per 100lb.
Potatos—Bermudas $4.25 per barrel.
Rice—Ballam $4.90 per bag. Patna $3.75 per bag.
Sugar—in hogsheads ; $1.00 per 100lb. and $5.00 for hogshead, in bags $1.20 per 100lb.

British Guiana,—June 5, 1902.—Messrs. Weiting & Richter.

Arrowroot—$6.50 per barrel.
Cacao—native 11c. to 12c. nominal.
Cassava Starch—$6.00 to $6.50, per barrel.
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica 12c. to 13c. per lb. (retail.)
Eddoes—$1.44 per 100lb.
Onions—string $3\frac{1}{2}$c., per lb.
Pea Nuts—American $4\frac{1}{2}$c. to 5c. (retail.)
Plantains—20c. to 30c. per bunch.
Potatos English—$3.00 per barrel.
Rice—Ballam $4.80, Patna $5.65, per bag.
—Creole Rice 20c. per gallon, retail.
Sweet Potatos—Barbados $2.16 per 100lb.
Tannias—$1.44 per 100lb.
Yams—$1.92 per 100lb.
Molasses—Vacuum Pan yellow 16c. per gallon, casks included.
Sugar—Dark Crystals $1.66, yellow $2.15 to $2.30 per cwt.
Timber—Greenheart 32c. to 40c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—June 5, 1902.—Messrs. Edgar Tripp.

Cacao—no quotation.
Coffee— "
Onions—$2.00 to $2.15 per 100lb.
Potatos English—$1.30 to $1.40 per 100lb.
Rice—Yellow $4.70. White Table $5.90 per bag.
Sugar—no quotation.
Molasses— "

DEPARTMENT PUBLICATIONS ON SALE.

The 'WEST INDIAN BULLETIN.' A Quarterly Scientific Journal.

Volume I. Reports of the Agricultural Conference of 1899 and 1900 and other papers; complete, in the original paper covers as issued, post free, 5*s*. The parts can no longer be sold separately.

Volume II. Full report of the Conference of 1901, and other papers. Price, in original paper covers as issued, post free 2*s*. 9*d*.

VOLUME III. Number 1. Agricultural Conference of 1902; President's Address and Sugar Industry. Price 6d. Post free 8*d*. Number 2. Conference of 1902 (continued). Educational and General Papers. (In the press).

PAMPHLET SERIES.

(3,) Seedling and other Canes at Barbados 1900. Price 2*d*. Post free 2½*d*. (5.) General Treatment of Insect Pests, 2nd Edition Revised. Price 4*d*. Post free 4½*d*. (6.) Recipes for cooking Sweet Potatos. Price 2*d*. Post free 2½*d*. (7.) Scale Insects of the Lesser Antilles. Price 4*d*. Post free 5*d*. (8.) Cultivation of Vegetables in Barbados. Price 2*d*. Post free 2½*d*. (9.) Bee-keeping in the West Indies. Price 4*d*. Post free 5*d*. (10.) Manures and Leguminous Plants at Barbados, 1898-1901. Price 4*d*. Post free 5d. (11.) Hints for School Gardens. Price 2*d*. Post free 2½*d*. (12.) Seedling and other Canes in the Leeward Islands, 1900-1901. Price 2*d*. Post free 2½*d*. (13.) Seedlings and other Canes at Barbados, in 1901. Price 4*d*. Post free 5*d*. (14.) Screw Worm in Cattle at St. Lucia. Price 2*d*. Post free 2½*d*. (15.) Plain Talk to Small Owners. Price 2*d*. Post free 2½*d*. (16) Hints on Onion Cultivation, Price 2*d*. Post free 2½*d*.

'NATURE TEACHING.' A text book based upon the general principles of Agriculture for the use of schools. Prepared by the Honourable Francis Watts and others. (Pages XII and 199). Price, limp cloth 2*s*., in superior binding 2*s*. 6*d*. Postage, 3½*d* extra.

The 'AGRICULTURAL NEWS' A Fortnightly Review, Subscription 3*s*. 3*d*. per annum, post free

Agents for the sale of the publications of the Department :—

London: Messrs. DULAU & Co., 37, Soho Square, W. *Barbados:* Messrs. BOWEN & SONS, Bridgetown. *Jamaica:* THE EDUCATIONAL SUPPLY COMPANY, 16, King St., Kingston. *British Guiana:* The 'Daily Chronicle Office, Georgetown. *Trinidad:* Messrs. MUNRO, & Co., Frederick St, Port-of-Spain. *Tobago:* Mr. C. L. PLAGEMANN, Scarborough. *Grenada:* Messrs. F. MARRAST & Co., 'The Stores,' St. George. *St. Vincent:* Mr. W. C. D. PROUDFOOT, Kingstown. *St. Lucia:* Mr. R. G. MCHUGH, Castries, *Dominica:* Messrs. C. F. DUVERNEY & Co., Market St. Roseau. *Montserrat:* Mr. W. LLEWELLYN WALL, Plymouth: *Antigua:* Mr. F. FORREST. St. John's. *St. Kitts:* Messrs. S. L. HORSFORD & Co., Basseterre

THE BARBADOS MUTUAL LIFE ASSURANCE SOCIETY.

ESTABLISHED 1840.

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Transactions to December 31, 1901.

Total Assurances Issued	£11,752,403
Total Bonuses Declared (31 December 1900)...	3,610,921
Sums Assured and Bonuses Existing	5,154,157
Total Claims by Death and Matured Endowments	5,375,545
Life Assurance Fund	2,118,650
Annual Income	245,343
Net Surplus December (31 1900)	297,124

The Premiums are Lower than those charged by other Life Offices doing business in the West Indies.
The Bonuses declared have not been equalled by any other Assurance Society in the world.
Its Policy Contracts are Liberal, Fair and Equitable.
The Policy is Absolutely Non-Forfeitable so long as any surrender value remains.
Loans granted on Security of Policy.
Liberal Surrender Values.
Claims promptly paid.
Every facility given for the revival of Lapsed Policies.
It grants Interim Bonuses.
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All the profits belong to the Policy-Holders.

May 22, 1902.

H. J. INNISS,
Secretary.

Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. I. No. 6. BARBADOS, JULY 5, 1902. PRICE 1*d*.

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Volcanic Eruptions.

DURING the last two months the West Indies have been prominently before the world in connexion with the terrible volcanic eruptions at Martinique and St. Vincent. The news that has been comunicated to the newspapers in Europe and America has not exaggerated, in the least, the appalling loss of life that has occurred in the two islands named, especially at Martinique.

Already three Scientific Commissions, appointed by the French, the United States and the British Governments, are engaged in a careful investigation of the volcanic phenomena that have accompanied hese eruptions. We shall probably learn, before long, a good deal as to the course of events before and during the eruptions and possibly, also, how far it may be possible in the future to prevent such an overwhelming calamity as that which so suddenly overtook the inhabitants of St. Pierre.

At Martinique the last previous eruption of Mont Pelée occurred in 1851. Since then it is recorded (according to Mr. J. Milne in *Nature*) that in an interval of twenty-six years, omitting mere tremors, 148 distinct earthquake disturbances have been credited to the island. As volcanic outbursts are usually, but not always, preceded by earthquake shocks it is possible, if due notice had been taken of the latter, with close observation of the changes taking place at the crater itself, that the people of St. Pierre might have been warned to flee before the final catastrophe.

It is stated, on good authority, that Professor Gaston Landes of the Lycée and Director of the Botanic Gardens had fully realised the danger and had issued warnings to the inhabitants, long before the eruption actually took place. On this point, as well as on the exact nature of the terrific tornado, accompanied by red-hot ashes and boiling mud, that destroyed the

town and its inhabitants, further information is anxiously awaited. On May 8, when Pelée burst an opening on its flanks, it is stated 'that a whirlwind of fire or a sheet of flame followed by red-hot ashes, stones and boiling mud, swept over St. Pierre and its harbour to sear and scald and fire all that it passed.' As to the nature of the flame it has been suggested that it was caused by the ignition of 'water gas'; others that the death-dealing vapour consisted of sulphuretted hydrogen or of hydrochloric acid.

It is admitted that, so far, there has been no flow of lava either at Martinique or St. Vincent and very little pumice has been found.

At St. Vincent, the phenomena that accompanied the eruption were apparently on simpler lines than at Martinique but they were equally violent and caused great destruction of life and property. On the Leeward coast the loss of life was slight, as, fortunately, the inhabitants had been warned in time by the Government. On the Windward Coast, owing to the scattered character of the settlements it was impossible to reach them at the last moment and communication by telephone was cut off.

Mr. Alexander Porter describes the effects of the eruption at St. Vincent as follows: 'Most of the destruction has taken place in the Carib Country, or Windward side of the island, where over 1,600 lives have been lost, but in all probability the total loss of life will never be known, but it cannot be far short of 2,000. The Carib Country has been nearly destroyed. The Estates of Tourama, Orange Hill, Waterloo, Rebecca and Lot 14 have been almost obliterated with nearly every soul and animal living thereon, while Mount Bentinck and Langley Park Estates, have also suffered considerably. The loss of property and live stock in this part of the island unfortunately falls, almost entirely, on one individual. In the Leeward district the damage has also been serious, although the loss of life has not been more than eight or twelve. The Estates of Richmond and Wallibou have been destroyed and considerable damage has also been done to Fancy Estate, otherwise the other parts of the Island and Estates have suffered but little.'

SUGAR INDUSTRY.

Cane-Farming in British Guiana.

The Board of Agriculture of British Guiana has recently pursued inquiries as to the area under cane-farming in the Colony, and in the *Official Gazette* for June 14 last, the following return, showing the estimated area occupied in cane-farming in British Guiana, was published :—

County.	*Total estimated acreage.*
Demerara	141
Berbice	383
Essequebo	760
	1,284

Classified as follows :—	*Acres.*
1. The property of Villagers and small Cultivators	110
2. Land on Sugar Estates, leased or rented to Farmers ...	563
3. Estates on which the manufactnre of Sugar has been stopped, and which are now occupied in growing canes for sale to neighbouring Estates	611
	1,284

The Sugar Beet.

In *Farmer's Bulletin* No. 93 of the U.S. Department of Agriculture occurs the following interesting summary of the progress of the sugar beet industry :—

The sugar consumed in the world up to 1850 was nearly all derived from the sugar-cane, but at the present time two-thirds of the sugar crop is from the sugar beet. Between 1863 and 1889 Germany, one of the leading beet sugar producing countries, increased its out-put 338 per cent. It would once have seemed incredible that the kitchen garden should furnish a rival for the 'noble plant' that had made the fortunes of Spanish and English colonists, but the cultivation of the beet has in one generation shifted the centre of the sugar industry from the tropic to the temperate zone. This growth has been fostered by strange vicissitudes in the fortunes of nations, as the commercial embargoes and sugar bounties of the Napoleonic wars, and by the emancipation of slavery in the British Colonies, giving, as it did, a temporary check to the growth of the cane ; but the real creators of the new industry were men of scientific training who solved certain botanical and chemical problems. The manufacture of sugar is now a chemical industry as much as is tanning and dyeing.

Marggraf, a chemist of Berlin, first discoverd in 1747 that beets, with other fleshy roots, contained crystallizable sugar identical with that of the sugar-cane. In 1776 Marggraf's pupil, Achard, erected the first factory for beet sugar, and in 1799 he brought the subject before the French Academy. He manufactured beet sugar on his farm in Silesia, and presented loaves of refined beet sugar to Frederick William III, of Prussia, in 1797 ; but the 2 to 3 per cent. of sugar that could be extracted by the methods then in use was too small for commercial success. A new stimulus was given by the sugar bounties of Napoleon in 1806, and methods were rapidly improved, especially in France. Two great difficulties were still to be met : the percentage of sugar present in the beet was small (6 per cent.), and it was separated with great difficulty from the many non-sugar constituents, some of them acrid and of very unpleasant taste. Science now came to the rescue, and beet was gradualiy developed having a larger percentage of sugar and a smaller percentage of the undesirable impurities. Barber says that, in 1836, 18 tons of beet root were necessary to produce one ton of sugar ; in 1850 this quantity was reduced to 13·8 ; in 1860, to 12·7, and in 1889, to 9·25 tons. From 6 per cent. of sugar as found by Marggraf the sugar beet of good quality now contains 15 per cent. and more, 12 per cent. being considered necessary for profitable manufacture.

VANILLA.

Cultivation in the Seychelles.

(Continued from page 67.)

PLANTING.

Trees being in readiness, planting may be done at any time of year here. If during a wet spell, vanilla will sprout all the quicker; should it be dry, the plants will delay a little, but there is no fear of their missing if properly planted, and the one danger point to guard is where the vine leaves the earth. This part of the vine is burnt through if not shaded with grass or leaves. However, this also would only mean a little delay in the start of growth; for though they take some time longer about it, vanilla cuttings will grow well enough if merely tied to the trees with their lower ends some inches clear of the ground. Illustrative of the extreme vitality of plants under adverse conditions, it may be mentioned that in neglected plantations, where the vines have been allowed to climb well up into the branches of good-sized trees, and then been broken in attempting to get them down, the broken portions, sometimes partly swinging free, have remained green and capable of growth for upwards of a year, sending down long aerial roots 15 or 20 feet in length, and in some cases where these have escaped injury the broken plant may re-establish connexion with the soil and start to grow again. If planted clear of the ground and merely tied to the supporting tree, it is advisable to tie two or three large leaves round each vine for the distance of 3 feet up; thus shaded the aerial roots quickly burst through the stem, and getting something to cling to at once, soon make their way to earth without injury.

LENGTH CUTTINGS TO USE.

In starting a new vanillery, where the estate has no plants these are readily purchased here at small cost. From 2 to 3 rupees (55 to 90 cents) per 100 fathoms is the usual rate for cuttings, the fathom being what a man can span with outspread arms, a good sweep of the vine hanging in a curve between his hands. Where choice is possible, although oldish cuttings will grow pretty well, it is best to have the plants of recent growth; in fact, growing shoots, cut off close to where they spring from the parent vine, are preferable. At their point of origin the nodes for some distance are close together, and though roots will strike from any joints, they have a natural tendency to do so quicker at the shoot's base. As to the length of cuttings to plant, opinions differ; but there can be no question that the longer cuttings produce cropping plants sooner than the short ones. If a 2 or 3-foot branch is planted, the shoot it gives is invariably more slender and slower of growth than would be that from a 6-foot cutting, and up to 10 or 12 feet every advantage lies with the longer plants, except the additional expense.

The question as to whether cuttings of that length are to be planted whole or divided into two or three plants should be settled by their cost. It is usual here to loosen the soil with a hoe where vanilla is to be planted, and bury the end, laid horizontally, an inch or two in the earth. Quite as good a way is merely to press the lower part of the plant into the soft soil until it is flush with the surface. On sloping land loosened soil washes away sooner with heavy rain, and in such situations it is better to leave the ground quite undisturbed. In any case the leaves on that part of the vine which rests in or on the ground are cut off fairly close to the stem, and an arm full of leaves, fern, grass, or forest sweepings laid on the top to the depth of 3 or 4 inches, for a couple of feet around the plant. Its roots will not need to be mulched for a greater distance than that for some months to come, and to cover a larger area would be useless. As new top dressings are laid on, which must be done when the first supply rots down and becomes thin, these can be gradually extended to allow of more root spread, till the limit of 4 feet radius is reached. If well covered, the roots do not run much; only starved vines run far with their roots, seeking nourishment; where this is plentiful they mat in and beneath it. Being entirely surface feeders, should any make their way beyond the cover they can be gently lifted and tucked under the decaying leaves, etc.; but this is a hint that the plant needs a new supply of top dressing. The number of joints laid on or in the soil will vary with the length of the plant, but should not be less than three for this mode of planting, while for long cuttings six or seven joints are needed for a quick start.

SUPPORT FOR THE YOUNG PLANTS.

If of sufficient length, the free end of the planted vine is hung through a fork of the supporting tree, but it is also advisable to tie it in two or three places to the tree to hinder swinging and chafing. The material used for these ties here is a fibre called *Vacoa** which rots in about a year, by which time the plants should have tendril-like roots enough to steady themselves. When once properly planted, the cuttings will need little or no attention for some months, but when the growth becomes vigorous the shoots must be looked after. Such of them as have grown clear of their supports are hitched up and, if long enough, hung through one of the forks. An occasional tie here may also be necessary, but in general, a leaf or two of the growing part can be hooked on to some other fixed part of the vine, and in a few days unless blown loose, the tendrils will have fastened to the leaf, and thus support the plant. Shoots must not be allowed to climb very high among branches of the supporting tree, especially if there be many and close together, or there will be breakages in getting them down. For this purpose, when they get beyond hand reach, a forked stick 6 or 7 feet long is useful. The fork is worked between the tree and climbing vine, and its tendrils in succession are broken by pushing and twisting the stick when they are within the fork. The last two or three tendrils are easily broken or leave the tree without breaking, and care should be taken when the vine is nearly clear to catch the stem of it high up, within the stick's fork; it can then be lowered gently without fear of breaking.

Some judgement is necessary in selecting the fork of the tree through which each shoot is to hang, a fork whose height fits in with a natural bend of the vine, if it has one, being chosen; otherwise one whose height takes the vine between joints is best, since if bent at a joint the vine is apt to snap, especially so when in vigorous growth, being then full of sap and brittle. In good growing weather—i.e., warm, still, and moist—healthy, well-nourished vanilla vines grow very rapidly, an inch per day being no uncommon rate.

(To be continued.)

* Obtained from a species of screw pine, *Pandanus utilis*.

WEST INDIAN FRUIT.

PACKING ORANGES.

At the West Indian Agricultural Conference held in 1900, Mr. Hart, the Superintendent of the Royal Botanic Gardens, Trinidad, read a paper on 'the Packing and Transport of plants, fruits and seeds' *(West Indian Bulletin,* Vol. I., p. 296) containing valuable suggestions and rules for observance in the packing and transport of fruit. In his *Annual Report* for 1901-2, Mr. Hart suggests the following rules to be complied with in packing oranges for export, to ensure the safe transport of the fruit, in good order, to distant markets:—

(1) Pick on a dry day, without bruising, 'stem cutting' the orange from the tree, not pulling or shaking down the fruit. Any orange which falls should be rejected, as it will assuredly spoil others.

(2) Dry for two or three days by spreading carefully in a single layer on a boarded floor, where there is plenty of air—until the skin becomes slightly leathery.

(3) Wrap each orange singly, and pack in boxes containing not more than a single cubit foot in each division, and pack tightly so that they do not bruise each other in transit. The boxes should be made with air spaces between the slats. It is important to remember that *Oranges are as tender as eggs* and should be handled as carefully.

GRAFTING NUTMEGS.

The advantages to be derived from the employment of grafted nutmeg plants have been referred to on page 69 of this Journal. In the *Report* on the Jamaica Botanic Gardens for 1900, Mr. T. J. Harris gives the following practical directions for grafting nutmegs:—

Stocks ready for grafting ten months after sowing; still in bamboos.

Select the tree which bears the largest nuts, construct rough but level stages of different heights around the tree; draw some of the main branches down to the stages with wire attached to pegs driven into the ground, place moss or cloth under the wire to prevent its cutting the bark of the branch. The strongest only of the shoots should be used as scions.

Cut a thin slice of the bark from the side of the seedling stock taking care to cut through the cambium, this cut to be about 2 inches long and about 4 inches from the base of the plant. Make a corresponding cut in the side of the scion at the point at which it is of the same diameter as the stock (it may be 8, 9 or 10 inches from the tip of the shoot) and opposite the cut on the latter.

Place the two cuts together at once and tie tightly with raffia or grafting tape. Allow them to remain for two months, watering carefully meantime; at the end of which time a small notch is made with a very sharp knife on the scion just below, and on the opposite side to, the union. Eight or ten days later the notch is made deeper by cutting out a little more wood; this time nearly severing the scion from the tree.

A week after take a sharp pair of shears and complete the cut.

Take the grafted plants at once to a cool, moist corner out of the reach of hot dry wind.

Two weeks later the top of the stock may be cut off close down to the union.

After six weeks' stay in the cool, moist corner, they may be gradually hardened off to the conditions of the plantation, and when ready can be planted out.

Remove the raffia or grafting tape when the first young leaves begin to develop on the scion.

BANANA DISEASE IN EGYPT.

In the *Agricultural News* of April 25, last, (p.7) reference is made to a disease of bananas in Egypt. The variety chiefly cultivated there is similar to the Canary banana, viz., the well-known Chinese or dwarf banana, also common in the West Indies. The disease is apparently caused by nematode worms attacking the roots. Similar worms *(Heterodera)* attack the sugar beet, cotton, cow-pea, coffee and many other cultivated plants. Further, the banana in Fiji, New South Wales and Queensland is also affected by these pests. So far a banana disease associated with nematodes does not seem to have been noticed in the West Indies. As however the cultivation of bananas over large areas has been undertaken in Jamaica and may possibly be carried on in other islands, pests which may have been present for years are not unlikely to make themselves felt under the new conditions. Consequently it would not be surprising if this banana disease made its appearance sooner or later in the West Indies. It will not be out of place therefore, to indicate the symptoms of the Egyptian disease and suggest possible remedies. The plants attacked suffer a sudden check in

growth, the young leaves gradually decay and, finally, the growing point of the stem becomes rotten. Examination of the root-system shows that the lateral roots are destroyed and that nob-like swellings containing the nematodes occur at the end of the main roots. (*Journ. Roy. Hort. Soc.*, Vol. XXVI, p. 844 and p. CCXXII, April, 1902).

Various direct remedies have been suggested to combat this disease, such as the application of slacked lime, lime mixed with soot, or lime from gas works. In addition it is probable that some varieties of banana may resist the disease much more than others and that as in the case of the similar sugar beet disease, other plants may be found, which, if planted with the bananas will attract the worms and thus serve as traps for the pest. Another remedy which has been found suitable in similar diseases is to throw the land out of banana cultivation, then to cultivate it thoroughly and to grow some rotation crop before replanting in bananas. Possibly some leguminous crop like the velvet bean would be useful in this connexion.

CACAO.

Experiments in drying at Dominica.

The Cacao drying house recently erected by the Imperial Department of Agriculture in the Botanic Gardens, Dominica, was fully described, with a figure, in the *Agricultural News*, p. 19. We append now, an account of some recent trials, communicated by Mr. J. Jones, the Curator of the Station:—

The experiments made in January with all the six trays filled, demonstrated that cacao placed in the box at 9 a.m. one day was completely dried at 9 a.m. the next day, that is, within 24 hours of being placed in the drier. This result was obtained without the fan being worked after 9 o'clock at night. Several other tests made, proved that cacao placed in the drier at 9 or 10 a.m. is easily finished by the afternoon of the following day without excessive application of heat. If necessary, cacao could be dried in twelve hours, but the beans would possibly suffer somewhat by the heat. The aim should be to maintain a temperature of 110° to 120° F. with a good draught passing over the beans. Such conditions approach very nearly to those of sun drying. The use of the apparatus is not restricted to good weather for cacao can be dried in the air for the first day and placed in the box in the evening. The beans thus continue drying without interruption during the night, and by placing them in the sun the next morning they will be finished during the day. In damp weather a drying apparatus is indispensable to growers in wet districts, who make from 60 to 70 bags per annum, as insurance against loss.

The drying house here has been examined by many planters, who express approval of its simple construction and effectiveness. One of the largest cacao growers in the island has taken preliminary steps to erect a drier of similar pattern in time for his next crop.

It is certain that no planter who makes a large crop will continue to put up with the loss and worry attendant on the drying of cacao during damp weather, now that a simple and effective drying box can be easily constructed and economically worked. The cost per bag of drying cacao is, with its aid, reduced to a minimum.

COW-PEAS.

DISEASE-RESISTING VARIETIES.

The production of hardy varieties is a method which has of late years been suggested as a means of combating various diseases, such as those which attack the roots of plants and which often cannot be directly dealt with in a satisfactory manner. Perhaps an extended investigation of the root disease of the sugar-cane might result in the finding of a race or variety which would be more immune to this destructive malady than those at present under cultivation. That the finding of such a remedy is both practicable and probable is evident from the success which has attended the production of grapes resistant to *Phylloxera*, in Europe, and of cotton, resistant to the wilt disease, in the United States. Following up the success which has attended the production of hardy varieties of cotton, the United States Department of Agriculture has recently succeeded in finding a cow-pea which resists both the wilt disease of this plant, so common in the Southern States, and also the malady known as 'root knot' caused by the universal nematode worm (*Heterodera radicicola*). [*Some diseases of the cow-pea.* By W. A. Orton and H. J. Webber. *Bulletin* 17, Bureau of Plant Industry.]

The root knot of cow-peas is produced by the irritation due to the presence of these minute worms in the tissues of the roots. The resulting swellings can readily be distinguished from the root tubercles caused by bacteria. It is quite probable that cow-peas are affected by nematodes in the West Indies and perhaps also by the wilt disease. So far, however, no specimens affected by these maladies have been received by this Department.

Extended trials have been made by the United States Department of Agriculture in South Carolina, with various varieties of cow-peas on soil badly affected both by the wilt fungus and also by nematodes (the so-called 'pea-sick' soil). One variety, the Iron cow-pea, was found to resist both diseases and to give heavy crops where all the rest failed.

The Iron cow-pea is described as 'a compact vigorous plant, of medium size and somewhat trailing in habit. The foliage is dark green with a peculiar bluish lustre that distinguishes this variety from others. The seeds are small and hard. The colour is buff and somewhat variable, seeds of different shades being found in the same pod.'

It is hoped to obtain some seeds of this variety for trial in the West Indies.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the Commissioner, Imperial Department of Agriculture, Head Office, Barbados.

It is particularly requested that no letters be addressed to any member of the staff by name. Such a course may entail delay.

Communications should always be written on one side of the paper only. It should be understood that no contributions or specimens will, in any case, be returned.

All application for copies of the Agricultural News should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on the last page of this number.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Cases for holding the numbers of the *Agricultural News*, with gilt lettered, leather backs, may be obtained from the 'Advocate' Office, Bridgetown, Barbados. Price 2*s*. Post free 2*s*. 4*d*.

Agricultural News

Vol. I. SATURDAY, JULY 5, 1902. No. 6.

NOTES AND COMMENTS.

Honour to Sir Joseph Dalton Hooker.

The German Emperor has, with the consent of the British Government, appointed Sir Joseph Dalton Hooker, G.C.S.I., C.B., late Director of the Royal Botanic Gardens at Kew, a foreign Knight of the Order *Pour le Mérite* for Science and Arts. It has been officially decided that the regulations regarding foreign decorations do not apply to this order.

Manurial Value of the Volcanic Dust.

It is evident from the numerous chemical analyses that have now been made of the volcanic dust that fell at Barbados, that it was of little or no manurial value. This fully bears out the opinion already expressed in the pages of the *Agricultural News*. Professor Harrison in commenting on the figures published on p. 89 adds: 'these conclusively show that the volcanic dust was quite valueless as a manure—the value of the soluble constituents being about three cents.' Owing to the copious rains that fell immediately after the dust, causing a sudden bursting of leaf and flower on plants that had previously been parched by drought, a popular idea has arisen that the dust was, more or less, of a fertilizing character. It is believed, probably on good grounds, that it was useful in destroying the small black ants common at Barbados, and in drying up the egg-clusters of the moth-borer then on the leaves of the sugar-cane.

Scientific Commission at St. Vincent.

The members of the Scientific Commission for the study of the recent Volcanic phenomena in the West Indies, Dr. T. Smith Flett, D.Sc., F.R.S.E., and Dr. Tempest Anderson, B.Sc., F.G.S. arrived at Barbados in R.M.S. 'Trent' on Sunday 8th. ultimo. They were received by Dr. Morris who afterwards arranged for a meeting between them and Dr. Jaggar, a member of the United States Geological Survey, who had been one of the first to ascend the St. Vincent Soufrière after the eruption. Drs. Flett and Anderson arrived at St. Vincent on the morning of the 10th. ultimo and were cordially received by the Governor and principal residents. We learn that Sea View House was placed at their disposal by Mr. James E. Richards, and from this commanding position a fine view of the Soufrière and the coast as far as Morne Ronde was obtained. On the 13th. they proceeded in a boat and examined the coast, and the next morning with difficulty they ascended the Soufrière, to the edge of the crater, at an altitude of 2,700 feet. In spite of heavy rain they had a glimpse into the cauldron beneath, which appeared to have three distinct lakes at the bottom, one still emitting steam and jets of mud. The Commissioners returned to Kingstown on the 20th. ultimo and then left for Georgetown with the intention of ascending the Soufrière from the Carib country. The Commissioners express their indebtedness, especially to Mr. T. M. MacDonald and Mr. H. Powell, the Curator of the Botanic Station, for valuable assistance afforded to them.

Arbor Day in the West Indies.

We are glad to find that the suggestion offered in these columns to appoint an Arbor Day for the West Indies has been well received and is likely to be generally adopted. Owing to the postponement of the Coronation Ceremony the official planting of numerous trees, already arranged for, had to be unavoidably deferred. In the mean time we desire to thank those who have taken so deep an interest in the matter, and we recommend that arrangements be made to keep the plants in good order and put them out at the first opportunity. The *Argosy* of British Guiana had a sympathetic article on the subject. It pointed out that the movement in favour of tree-planting is being widely adopted in other countries and in such distant parts of the Empire as Australia and South Africa. At Bloemfontein, in our newest Colony, it had been officially announced that June 26 was to be kept as an Arbor Day. We hope to recur to the subject later.

Jamaica Honey and Grape-Fruit in England.

Sir Alfred Jones has been making great efforts to popularize Jamaica honey and grape-fruit in England. Recently he obtained 500 jars of honey from the agency in London of the Jamaica Bee-keepers' Association and he forwarded samples of both honey and

grape-fruit to numerous friends. In the case of the grape-fruit he enclosed directions as to the manner of preparing and eating it. The acknowledgments received were recently published in full in the *Jamaica Gleaner*. One gentleman wrote: 'I did not know honey could be got from Jamaica'; another 'our Scotch heather-honey will quake when it sees this West Indian rival'; a third 'the grape-fruit prepared as you described was delicious.' As a result we read: 'Mr. Dickson, the salesman in England of the Jamaica Bee-keepers Association has obtained the contract to supply the entire fleet (of over one hundred ships) belonging to Messrs. Elder Dempster & Co., with Jamaica honey and guava jelly.'

Stock at St. Lucia.

In order to improve the breed of beef cattle at St. Lucia, at the request of the Agricultural Society in that island, the Imperial Department of Agriculture made a grant for the purchase of a shorthorn bull. A fine animal was recently imported through the Department of Agriculture at Nova Scotia and landed at Castries on March 8, last. By last mail the Administrator reported that the animal had died somewhat suddenly at Choc from an affection of the stomach. It is generally believed that well-bred shorthorn bulls are very delicate in the tropics. It has certainly proved so in this case. Probably a Hereford bull would be found better suited to the climate of St. Lucia.

Lagos Silk Rubber at Trinidad.

On page 54 of this Journal we drew attention to the Central American rubber tree *(Castilloa)* and the Lagos silk rubber tree *(Funtumia)* as the most promising rubber trees at present for cultivation in the West Indies. Mr Hart, the Superintendent of the Royal Botanic Gardens, Trinidad, in his *Annual Report* for 1901-2 comments on the hardy nature of the Lagos silk rubber tree. He writes:—

'The trees have given a fine crop of seed during the past season, and a large quantity of plants have been raised. From present appearances it is a tree that will stand, probably, more hardship than any of the other rubbers, as it can bear exposure to the sun although it does not grow fast in such situations . . . . . A plot of this rubber has been planted at 3 feet apart and in the full sun, in order to test its growth under the conditions of close planting and growth without shade.'

Peaberry and other Coffees.

The *Queensland Agricultural Journal* contains this interesting note on the relative values of Peaberry and other Coffees:—

'The Santos correspondent of the *Brazilian Review* remarks that when comparing the roasting and drinking qualities of washed coffees (the finest qualities of which were selling at the time he wrote at $9.00 to $9.50) with those of superior Peaberries which fetch from $9.50 to $10, one cannot help feeling rather distressed about the strange and incomprehensible ways in which the coffee trade is carried on. On the one hand, he says, a perfect roasting and tasting produce is offered at prices from 50*s.* to 54*s.*, whilst for peaberries full of black beans, cherries, stones, sour beans, and of no roasting merit, and evidently tasting like an ordinary flat bean, good if not regular, there is an eager demand at prices from 54*s.* to 57*s.* Evidently *mundus vult decipi*. If people would only learn at last that, round and flat coffee berries grow on the very same bush'! *Planting Opinion.*

Shade in Cacao Culture.

Just as the use of leguminous plants in crop rotation in temperate agriculture is a legacy from the agriculture of the past, so the use of leguminous trees in Cacao culture in the tropics has been handed down from the prehistoric agriculture of the native races of South America. That this is so is seen from the following passage taken from Acostas' account of cacao in *The Natural and Moral history of the Indies*. 1590, Hakluyt Society Edition, 1880:—

'The tree whereon this fruite growes is of reasonable bignesse, and well fashioned; it is so tender, that to keep it from the burning of the Sunne, they plante neere unto it a great tree, which serves only to shade it, and they call it the mother of cacao. There are plantations where they are grown like to the vines and olive trees of Spaine. The province where there is greatest trade in cacao is Guatemiala. There grows none in Peru, but this country yields coca, respecting which there is another still greater superstition.'

A new Cacao Experiment Station in Java.

An interesting development in tropical Experiment Station work has recently taken place in Java. As is well known there are in that island two Experiment Stations entirely devoted to the investigation of questions relating to the cultivation of the sugar-cane and the manufacture of sugar. The funds required for these stations are subscribed by the planters themselves. In 1901 a new station, entirely devoted to the cacao industry, was started at Salatiga under the direction of Dr. L. Zehntner, late Entomologist to the West Java Sugar Experiment Station. Two bulletins of the new cacao station, dealing with insect pests, have been received by the Department and will be noticed in a future number of the *Agricultural News.*

Tree-planting Competition.

From the *Journal* of the Royal Horticultural Society, we extract the following note on a tree-planting prize competition, described in the *Agricultural Journal* of the Cape of Good Hope, Vol. XIX, pp. 387-403:—

This paper gives the result of the competition held, in terms of the resolution of the Honourable the House of Assembly. The plants used in the formation of the new plantations at Diep Kloof, George, at an elevation of about 800 feet, were *Acacia mollissima* and *A. pycnantha*, and 90,000 trees, averaging 20 feet in height and 1,050 per acre, have been established. While at Schoonberg, George, on the opposite side of the Outeniyua Mountains, the plantation entered for competition is composed entirely of Blue Gum *(Eucalyptus Globulus)* with the exception of some 300 *E. diversicolor* planted in one block.

INSECT NOTES.

The sapodilla fruit is scarcely a common article of food, but it is to some extent appreciated as one of the West Indian fruits. Persons who like it will possibly appreciate it less from knowing that the sapodilla is the habitat of a peculiar maggot, but this feeling need not deter any one from enjoying a good sapodilla. If on breaking open a sapodilla one finds yellow maggots of some half an inch in length, one may look with suspicion on the whole batch and only eat after an inspection of each. This maggot is found in the ripe sapodilla, wriggling its way through the soft flesh of the fruit. If kept and allowed to remain in the fruit, it will presently come out and envelop itself in a hard, seedlike case. This, if kept, will presently yield a handsome fly of a black and yellow colour with long wings banded in a serpentine fashion. This is the insect known to science as *Anastrepha Serpentina*, Wied. Though of little economic importance, it may be of interest to those who are in the habit of enjoying sapodillas. A very similar insect occurs in Trinidad in guavas, and possibly the mango maggot of Jamaica also belongs to this family. Similar attacks on oranges in Mexico have led to an investigation by the United States Department of Agriculture, as it was feared that the insect, which infests ripe oranges, might find its way to the Southern United States and harm the orange industry. A well-known insect similarly attacks peaches and other fruit in Bermuda and elsewhere. The Barbados sapodilla maggot, though not important, is interesting, not only on its own account, but from the habits of other such flies elsewhere, and from the possibility there is of this fly becoming common and attacking other fruits. All sapodillas should then be destroyed, sound ones in the ordinary way, and infested ones by burying or burning.

Trinidad Moths.

In Part II of the Transactions of the Entomological Society of London for 1901, is an excellent catalogue of the *Lepidoptera Heterocera* (Moths) of Trinidad, by W. J. Kaye, F.E.S. Mr. Kaye enumerates 245 species, including those collected by himself and Mr. S. Kaye, and all those recorded in the British Museum collections. He estimates the probable number of moths in Trindad at one thousand, at least, so that there is ample scope for collectors in Trinidad to carry on the excellent work of Mr. Kaye. Of new species forty-five are described, so that the collection has made a useful addition to our knowledge of West Indian moths. It is to be hoped that those interested in insects will assist in our knowledge of the species found in these islands. Beyond a list of Dominica species numbering ninety-five, from the pen of Mr. H. Druce, and two papers of the 'Moths of the Lesser Antilles' by Sir George Hampson, little is known of the moths of these islands. Moths are easy to collect and do not require any appliances for preparation beyond a killing bottle and a supply of papers. Any specimens will probably be of value both for the British Museum collections and for the collection being made at the office of the Department of Agriculture.

Centipedes or Forty-Legs. The common centipedes known as 'forty-legs' are among the more formidable of the household creatures and are generally regarded with abhorrence. Their bite certainly is to be feared, but they are of such a retiring nature that they do not go out of their way to bite. In houses, their function is certainly a useful one, in that they destroy cockroaches and other vermin. One may balance the usefulness and modesty of the forty-leg against the obnoxiousness and unpleasantness of the cockroach and tolerate the former as an enemy of the latter. As a rule, the forty-leg, if caught, gets a short shrift, when mercy might well be shown him if his usefulness were taken into account.

VOLCANIC DUST.

Reports on the dust of May 7-8 at Barbados.

DISCUSSION AT THE GEOLOGICAL SOCIETY, LONDON.

At the meeting of the Geological Society of London, on May 28, a sample of the dust collected at Barbados by Dr. Morris was exhibited, and a note on a preliminary examination communicated by Dr. J. S. Flett, M.A., D.Sc., one of the Scientific Commissioners to St. Vincent, together with the following results of an analysis by Dr. W. Pollard, M.A., D.Sc., of the Geological Survey:—

Silica	52·81	per cent.
Titanium oxide	·95	" "
Alumina	18·79	" "
Iron oxide ($Fe_2 O_3$) ...	3·28	" "
Iron oxide (Fe O) ...	4·58	" "
Oxide of manganese ...	·28	" "
Cobalt and nickel oxides...	·07	" "
Calcium oxide	9·58	" "
Magnesium oxide... ...	5·19	" "
Potassium oxide	·60	" "
Sodium oxide	3·23	" "
Phosphoric anhydride ...	·15	" "
Sulphuric anhydride ...	·33	" "
Chlorine	·14	" "
Water	·37	" "
	100·35	per cent.

In the discussion which followed, Mr. J. H. Teall, F.R.S., the Director of the Geological Survey, 'called attention to the small quantity of potash revealed by the analysis and thought this might possibly be due to the glassy parts having been mechanically separated from the crystalline minerals in the air, as the sample analysed consisted mainly of such minerals. Hence if the area could be found where the glass fell, the discovery might prove important from the agricultural point of view. Nature would have been more bountiful if

she had let all the glass fall at Barbados and the minerals in the sea.'

BRITISH MUSEUM REPORT.

Mr. G. T. Prior, M.A., ofthe Mineralogical Department of the British Museum (Natural History) who also took part in the discussion at the Geological Society, has forwarded the following report to the Department on a sample of the same dust sent to the Museum :—

A sample of the dust was separated by means of heavy liquids into the following three main constituents :

(1) Light pumiceous grains in comparative small amount, about 4½ per cent.

(2) Grains of plagioclastic lime-soda felspar and deep brown glass, nearly opaque owing to magnetite, about 71 per cent.

(3) Heavy grains of magnetite, hypersthene, augite and a little hornblende, about 24½ per cent.

The mineral constituents of the dust indicate that the eruption is of an andesite character, and that in all probability any lavas which may be erupted will be found to consist mainly of hypersthene-augite-andesites similar to the prevailing lavas of Mexico and the Andes. The eruption is thus connected with the great American (Pacific) volcanic chain rather than with the Atlantic.

An examination of the volcanic dust, of much finer grain, which fell in Barbados after the eruption of St. Vincent in 1812 shows that, qualitatively at least, its composition is very similar to that of the present dust. It contains the same constituents, viz :—pumiceous grains, felspar, felspar grains and grains of magnetite, hypersthene and augite. The relative proportions however of the constituents in the two cases are different. The volcanic dust of 1812 contains comparatively few of the heavier grains of magnetite and pyroxenes (about 11 per cent.) but a larger amount of the glassy pumiceous material (about 9½ per cent.) As the dust of 1812 is said to have had a remarkably beneficial effect upon the crops of the following year in Barbados, the general similarity of the present dust with that of 1812 would suggest at first that a like effect might be expected next year. The fertilizing properties, however, probably depend to a large extent upon the more easily decomposed glassy material containing most of the potash ; the smaller amount of the pumiceous grains in the present dust therefore rather militates against the idea that this fall of dust will be to Barbados a blessing in disguise.

Chemical analyses of the dust have already been made and published, one by Dr. Pollard of the Geological Survey (*Proc. Geol. Soc.*, May, 1902) and one by Mr. B. E. R. Newlands (*Chemical News*, Vol. 85 (1902), p. 258). As it is not desirable that one Government Department should duplicate the work of another, I have made no chemical analysis myself but append here the result obtained by Dr. Pollard. [See previous page.]

If this analysis represents the composition of the dust over the greater part of the island, the small amount of alkalies and especially of potash supports the above suggestion that the present dust will be of less benefit as a fertilizing agent than that of 1812.

REPORT FROM THE GOVERNMENT LABORATORY BRITISH GUIANA.

Through the courtesy of the Government of British Guiana, the Department has received the following report by Prof. J. B. Harrison, C.M.G.,M.A., F.G.S.,F.C.S., on a sample of the dust which fell at Barbados on May 7-8 :

Dr. Morris' sample was collected by the Commissioner personally on a sheet spread on the lawn of his residence, and hence is free from impurities. The analysis of this sample by Mr. W. L. F. Kaufmann, the Assistant Analyst, has given the following results :—

	Dissolved by boiling Hydrochloric acid.		*Soluble in 1 per cent. solution Citric acid.*
Moisture	·180		
Loss on ignition * ...	·440		
Silica	51·760		
Titanium oxide ...	2·778		
Alumina...	22·679	7·745	·652
Manganese peroxide	·081		
Iron peroxide ...	3·290	4·470	·400
Iron protoxide ...	1·760		
Calcium oxide ...	9·440	4·779	·397
Magnesium oxide ...	4·230	·871	·214
Sodium oxide ...	2·500	1·782	·003
Potassium oxide ...	·458	·076	·004
Phosphoric anhydride	·111	·044	·019
Sulphuric anyhdride	·067	·067	
Sulphur in sulphides	·007		
Barium oxide ...	·132		
Lead	traces		
Copper	nil		
Nickel	traces		
	99·913	19·834	1·689
* Including nitrogen...	·011		

The constituents rendered soluble by prolonged boiling in 20 per cent. hydrochloric acid may be taken as representing the constituents of the sandy ashes which may be converted into soil constituents or removed therefrom in the course of years.

The readily available constituents of plant food present in the sample are determined by digestion, in the cold, with 1 per cent. citric acid for five days. These figures [the third column in the above table] conclusively show that this volcanic dust is quite valueless as a manure, the value of its soluble constituents being about three cents.

For other analyses see pages 44, and 73.

Curing an Egg-Eating Dog.

The *Queensland Agricultural Journal* suggests the following cure for this troublesome habit :—

Many and various have been the recipes given as a certain cure for a dog gifted with egg-eating propensities, but we can recall but one remedy which has proved effectual—a shot gun. A new idea however has struck some one with a chemical turn of mind. Possessed of a dog, one probably too valuable to destroy, which was in the habit of hunting for hens' nests and making a clean sweep of the whole contents, he tried a new plan. He blew an egg and filled it with strong spirits of ammonia, carefully plugging the appertures. This egg he placed among others in a nest well known to the dog, and awaited developments. In due time the egg-eater discovered the prize and proceeded to business, but when he crunched up that egg he sneezed, coughed, gasped for breath, fell down and writhed several times, and at last, when he had after ten minutes sufficiently recovered to proclaim his unutterable bliss, he fled and would never, afterwards, look at an egg. This is a simple remedy worth trying.

POULTRY.

Poultry at the Agricultural School, Dominica.

Mr. David Tannock has contributed the following notes on the poultry kept at the Agricultural School :—

BREEDS.

The following pure breeds of poultry are kept :—Black Orpingtons, White Leghorns, Golden Wyandottes, Plymouth Rocks and Perms Wyandottes. All do well, but for table fowls Black Orpingtons are the best, and for egg laying there are none to equal the White Leghorns. Of this breed we have a very good laying strain. Leghorns have also the advantage of seldom wanting to set, and being easily put off when they want to. Good, strong, hardy fowls are obtained by crossing Orpington hens with a Plymouth Rock cock ; the cockerels weigh 4 lb. when four months old.

RUNS.

The breeds are kept apart in separate runs, four breeds being kept in one part of the grounds, and the other with all the chickens and setting hens in another.

The runs are in short grass, but at one end a part is planted up with bananas for shade, and kept cultivated, so that the fowls can scratch and dust themselves in it. Some kind of shade is absolutely necessary for fowls in the tropics.

SETTING HENS.

The setting hens are put in small coops about in shady places. When making up the nest a few leaves of tobacco are put in to keep away fowl lice.

CHICKENS.

The first few days after hatching the chicks are kept in a covered run and fed on soaked bread and hard boiled eggs, but when about a week old they are allowed a full run and not penned up until about four months old. By allowing them a full run on grass they come on much better, are strong and healthy and free from all the diseases which attack chickens in Dominica. Small native or Game hens make the best mothers : they are more lively than the larger hens and hunt better for their chickens.

FOOD.

The food consists of boiled vegetables, such as sweet potatos, yams and bananas, mashed and mixed with a little corn meal or farine, given in the mornings, and cracked corn in the afternoon. Each brood is allowed out for a day's run in turns, when they can scratch and pick up all the grit they require.

People are wide awake to the value of having good poultry to breed from and to improve their native fowls. All the eggs are bought up for sitting, and there is a considerable demand for young cockerels and pullets. One hundred and sixty eggs for sitting, and fourteen chickens have been sold this year.

To Catch a Fowl.

Mr. D. F. Laurie, South Australia, says: To catch a fowl generally means a great disturbance, and often its plumage is damaged. A simple device obviates all this. A piece of No. 8 fencing wire is bent, so that a fowl's leg will fit easily in the crook ; turn the other end into a small loop and fix to a wooden handle with a screw and a couple of staples. A catcher 8 feet long generally suffices. Proceed quietly, having first offered some grain or other inducement ; stand behind the bird and jog him gently, and draw him towards you moving your grip ; he will come quietly, and rarely is there a flutter. No fuss and no damaged feathers. After a time it will be found that old stagers keep one eye on the 'catcher' and skip out of an embarrassing position with much skill. *Never carry poultry head hanging down* ; this does much harm to them ; a fat bird may not recover the ill effects, and they always flutter. Grip the legs firmly and place the birds on the left arm ; there is room for as many as you can grip the legs of. *(Queensland Agricultural Journal.)*

A correspondent writes :—I have an imported Plymouth Rock rooster whose legs have become covered with a hard substance like shell or scales, making the legs about three times the usual size ; he is also absolutely useless for breeding purposes; he is two years old. Can you suggest any remedy ?

GARDEN NOTES.

Recently there was noticed in the Gardens at Government House, Antigua, a specimen of the Mountain Pride of Jamaica *(Spathelia simplex)* in flower. This is a slender tree about 15 to 30 feet with a single stem surrounded by a tuft of feathery leaves. The purple flowers are produced in a large loose panicle above the leaves. The whole appearance of the tree in flower is very striking and ornamental. At the Antigua Botanic Station there was noticed a handsome tree of the Queen of Flowers *(Lagerstroemia Flos-reginae)* with *pink* flowers. Usually the flowers are purple. It would be useful to propagate this pink variety. A low growing *Crinum* (labelled *C. giganteum*), also at Antigua Botanic Station, with broad leaves and a low panicle of pure white, bell-shaped flowers, is a most attractive plant. It deserves to be more widely known in the West Indies.

At St. Lucia Botanic Station a splendid Bougainvillea with deep purple flowers (probably *B. glabra* var. *Sanderiana*) covering a tall tree has been in flower for several weeks. The brick-red Bougainvillea (*B. lateritia*) is not well known in the Leeward Islands. Plants might probably be obtained in exchange from the Southern Islands or Jamaica.

Preserving bright Steel and Iron work. In the tropics bright steel and iron work soon corrodes and becomes unsightly. Where it is especially desired to preserve arms and implements in a bright condition, a useful formula is suggested, obtained, many years ago, from the Curator of the Brighton Museum. The objects should, first of all, be carefully cleaned and all trace of rust removed. Then varnish with one or more coats of a mixture prepared as follows : One ounce of shellac, one ounce of gum mastic, one half-ounce of sandarac and one pint of methylated spirit. Dissolve and shake thoroughly. Strain through a fine muslin and apply warm. Keep the bottle corked. If necessary later, dilute with spirit.

EDUCATIONAL.

Cambridge Local Examination.

SECTION OF AGRICULTURAL SCIENCE.

The Education Board of Barbados has received the following letter, from Dr. J. N. Keynes, Secretary for Examinations of the Cambridge Local Examinations and Lectures Syndicate, with reference to the alterations proposed by the Imperial Department of Agriculture in the schedule of the new Agricultural Science Section, etc. (See *Agricultural News*, p. 27):—

'The proposed modifications of our Agricultural Science Schedules for candidates examined in the West Indies shall be at once considered, and I have no doubt that they will be substantially adopted.

I may add that the papers for next December will be set in accordance with the modified schedules.'

Trinidad.

AGRICULTURAL EDUCATION.

In his *Annual Report* for 1901-2, Mr. Hart, the Superintendent at the Botanic Gardens, gives the following account of recent work in Agricultural Education in Trinidad:—

The courses of agricultural lectures at St. Clair Experiment Station described in the last *Annual Report* were continued to August, 1901, when a class of fifty-seven attended, fifty-three of whom were school teachers and students, and four cadets belonging to the station. These lectures have been extremely popular and, I am confident, have done a large amount of good, especially in directing attention to the need of agricultural education for the working classes.

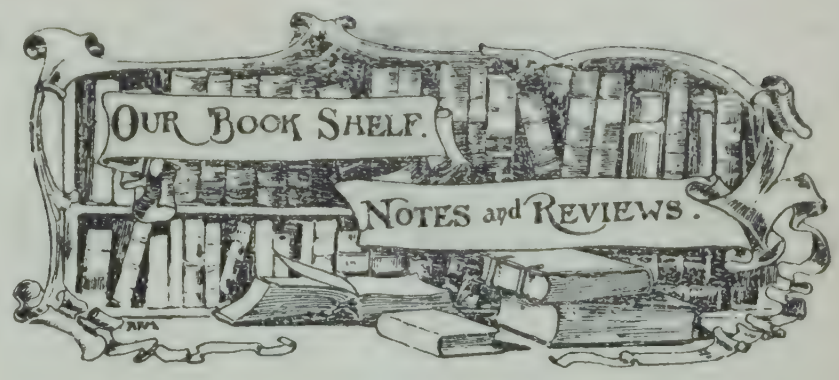
The class was conducted on the same lines as on previous occasions and good work was done by the majority of those who attended.

The cadets attached to the station came out well in the examination after the lectures, and some of them have obtained positions of trust on estates and promise well. Letters received from these young men show a high appreciation of the course of instruction given at St. Clair. In January the Superintendent was appointed a member of a Special Committee on Technical Education.

The Jamaica College.

In a memorandum issued by the Jamaica Schools Commission on Agricultural Education, it is announced that the name of 'The Jamaica High School and University College,' has been changed into 'The Jamaica College.' The Rev. Canon Wm. Simms, M.A., will in future be styled the Head Master of the Jamaica College.

A Remedy for White Ants (termites). Mr. E. E. Green, the Entomologist to the Ceylon Botanical Department, finds that carbon bisulphide promises to be a complete success for the destruction of these troublesome and destructive pests. On account of the extremely inflammable character of its vapour great care must be taken to avoid the use of lights when employing this article.



A TEXT-BOOK OF ELEMENTARY BOTANY. By Miss C. L. Laurie, with illustrations by Miss W. L. Boys Smith. *Allman & Sons Ltd., London. Price 2s. 6d.*

The number of modern elementary text-books of botany is already so large that every new comer is, perforce, subjected to careful criticism, and expected to show some distinguishing feature to justify its existence. Many, otherwise of no especial value, survive because they are adapted to some particular examination. The present volume is intended to be of use to students preparing for the Junior Oxford ,and Cambridge Examinations. For this purpose it will doubtless be of value. Judged by the higher standard of how far it will serve to help beginners to a knowledge of, and interest in, botany, the volume has the great advantage of being attractive to the eye. The type is clear and good, the matter well arranged, and freely illustrated throughout with drawings which are both new and above the average in clearness and artistic finish.

The book is divided into three parts, dealing, respectively, with the Structure, Classification and Physiology of Flowering plants. Part I. gives a clear, although for beginners a somewhat condensed account of the plant as a whole. The seed and germination form the starting point, and separate chapters follow on the several plant organs. This portion closes with a chapter on the dispersal of seeds and fruits. The more noteworthy points of this section are the general clearness of the subject-matter, the temperate use of technical terms and the useful summaries introduced from time to time. All the work described can be done without the use of the microscope.

In Part II twelve Natural Orders are treated in detail. In each a type is fully described, other plants indicated, the characteristics of the order stated concisely, and interesting notes on the pollination and geographical distribution of the order added. It is pleasant to note that in the larger orders more than one 'type' is described. Exception must be taken to the statement on page 101, that tropical vegetation is gayer than that of the temperate regions—an error long ago pointed out by A. Russel Wallace. The description, too, of 'orchids, which by their aerial roots pass from tree to tree' is distinctly misleading.

The Physiological Part is well arranged, and the experiments described deal with the more important of the life processes of the plant. The division into experiment, result and conclusion is praiseworthy. Experience has taught us that the apparatus shown in Fig. 143 is not trustworthy, and in the case of Fig. 145, some precaution should be taken against air entering under the jar.

These slips, however, by no means spoil a book which can be recommended for beginners, who, if they work through the experiments, as it is intended they should, can scarcely fail to acquire a healthy interest in, and considerable accurate knowledge of, the elements of botany.

It will probably interest many of our readers to learn that Miss Laurie is a niece of Sir G. C. Pile, Kt., the venerable President of the Barbados Agricultural Society.

JAMAICA.

Exports for 1901.

The following particulars of the exports of Jamaica for the year ending March 31, 1901, have lately been published in the supplement to the *Jamaica Gazette*:—

Annatto £5,800; Beeswax £5,656; Honey £10,739; Divi-divi £1,356; Cacao £64,488; Cocoa-nuts £41,345; Coffee £157,485; Bananas £618,636; Grapes £8,262; Limes £388; Mangos £298; Oranges £115,473; Pine-apples £1,033; Ginger £66,324; Kola nuts £171; Lime juice £5,408; Pimento £110,602; Rum £152,243; Sugar £165,941; Tobacco leaf £5,068; Cigars £15,654; Cigarettes £1,958; Logwood £98,619; Logwood extract £31,599; Yams £1,201.

The following notes on agricultural subjects are recorded by the Collectors for their respective parishes:

St. Andrew: Bee culture in this parish is still being extended, and I am informed by some prominent apiarists that some of the honey-producing districts are now over-stocked.

St. Ann: With the exception of Coffee the crops of all kinds have been good. The pimento crop in the Dry Harbour Mountains was considered the largest one for the past twenty-five or thirty years; the price realized was remunerative. Of course that was confined more to the large landed proprietors. The Lime Factory at Orange Valley is still being carried on with encouraging results. The yield was—essential oil, 25 cases = 117 gallons; concentrated lime juice, 13 puns. = 1,430 gallons; raw lime juice, 130 puns. = 14,300 gallons; the labour bill in connexion with these operations alone amounting to about £1,000 per annum. The Kokal Company at Rio Bueno which port is under this Customs survey commenced making oil in October, 1900. To March 31, last, thirty-five tons oil were shipped to New York. The company have a contract to purchase 2,000,000 nuts a year, besides outside purchases, and intend to import nuts.

Westmoreland: The Rice cultivation which received such a severe check from the floods of November 1899, has fortunately had good weather this year and the cultivators have been hard at work for the past three months, reaping and preparing the product for the market in the forms of shelled and unshelled rice and bran. The crop is expected to be a good one. This cereal is fast becoming one of the most important agricultural productions of the parish.

The Bee-keeping industry still increases, and is becoming an important source of subsistence to many persons besides forming a great auxiliary to the incomes of many others. My only fear is that so many persons are going into the business that shortly there will be the difficulty of getting the flowers to support so many apiaries.

St. Catherine: The fruit industry and the cultivation of cacao still continue to increase, but coffee, the mainstay of the majority of small settlers appears to be somewhat neglected on account of the low prices. This is a pity, because it is not a perishable crop, and the settler can keep it all during the year and sell when he most needs money, unlike fruit which must be disposed of at once.

The Dye Factory at Spanish Town has been steadily at work during the year, and logwood buying regularly carried on. The average prices paid give a fairly good margin to the growers if they choose to cut, but some proprietors won't sell at current prices, preferring to wait for better times, consequently there will be abundant reserves to draw upon should the demand increase.

VIRGIN ISLANDS.

Agricultural Efforts.

The following summary of a report by Mr. W. C. Fishlock, the recently appointed Agricultural Instructor in the Virgin Islands, forms a continuation of the remarks on page 10 of this Journal, with regard to Agricultural efforts in that Presidency:—

An interesting account is given of the present condition of the Experiment Station and suggestions of a practical character for extending the work and usefulness of the institution.

Notwithstanding the great scarcity of water during the recent severe dry season, fair progress has been made with nursery work and the propagation of plants generally. Already there are upwards of 5,000 lime seedlings available for distribution. These will shortly be given 'free' to peasant landholders desirous of taking up this industry.

Experiment plots of pine-apple, limes, cacao and other products are being successfully established at the Station.

School garden plots, where boys from the neighbouring schools can be trained in the best methods of practical agriculture under the supervision of the Agricultural Instructor have been laid out on the grounds of the Station, and will shortly be ready for the instruction of pupils.

A well has been dug near the Instructor's house and has resulted in obtaining a plentiful supply of excellent water for both drinking and nursery purposes. The report generally speaks hopefully of the outlook for Agriculture in the Virgin Islands.

DEPARTMENT NEWS.

Mr. Harold Maxwell-Lefroy, of King's College, proceeded on the 6th ult. to the degree of Master of Arts of the University of Cambridge.

Cocoa-nut with six branches. A cocoa-nut tree with branches sounds strange, but such a phenomenon does exist. A friend in Penang, where the tree grows, has just forwarded us photographs of the curiosity, stating in a note that it has six branches, all of which are bearing. There was a seventh branch, he believes, but it was blown down two or three years ago. This tree is unique, being, at least, a rare specimen of the kind we have heard of. The branches appear large and strong and seem to bear well, as in the photograph before us, they are loaded with nuts. There are cocoa-nut trees with branches to be met with in Ceylon, one such tree being at Dehiwala with two branches. (*Ceylon Observer*, Nov. 7, 1901.)

The Black Witch. The largest moth recorded at present in the West Indies is that known under the above name. It is familiar to many persons as a very large, dark, coloured moth with a slow flight like a bat. The wings are deep brown, with black and purple markings. The moth is frequently found in or near houses or buildings, and when disturbed by day it flies out and finds another dark place in which to remain till dusk. The moth occurs in the United States, but is believed not to breed there: the insect is a native of the West Indies. Its life-history should be of interest, and any information as to the food and habitat of the caterpillar would be valuable.

BRITISH GUIANA. ANNUAL REPORT ON THE BOTANIC GARDEN, 1901-2. By B. Gainfort, Acting Superintendent.

Mr. Gainfort having been in charge of the Gardens for only a short time attempts no more than 'a bare record of work done as shown by records, together with extracts from a report which has been prepared by the Head Gardener who took charge immediately after Mr. Jenman's death' in February last. (See p. 29).

The metorological tables, given in their usual detail, show amongst other points a rainfall for the year of 82·88 inches. Over $1,500 worth of plants and produce were sold or supplied to Government Institutions. A large number of palms and other trees have been planted out during the year. The oldest plant of the Palmyra palm, *(Borassus flabellifer)* bore an immense crop of yellowish brown fruit, and a younger plant has also borne a crop.

The native rubber plant, *Sapium Jenmanii*, known as 'Touckpong' by the Carabisi Indians and 'Cumakaballi' by the Arawacks, flowered in the Gardens for the first time in June. All the flowers were male. Amongst other items of economic interest it is reported that special attention has been devoted to raising a stock of grafted mangos and good varieties of oranges.

SHADE IN COFFEE CULTURE. By O. F. Cook. *Bulletin 25, Division of Botany, United States Department of Agriculture, 1901.*

The recent acquirement of tropical territory by the United States in the East and West Indies has been followed by considerable activity on the part of the Department of Agriculture in those regions. The preliminary steps towards the formation of Experiment Stations in Porto Rico and the Phillipines have been taken and a special agent in tropical agriculture, Mr O. F. Cook, has been appointed. Among the Bulletins from the pen of this investigator, that entitled 'Shade in Coffee cultivation' certainly takes the first place. The main idea of this bulletin is, that where shade trees have been found beneficial in cultivation like cacao and coffee, they have been leguminous trees, and their value depends rather on the fertility imparted to the soil by their root nodules than on the shade they impart. Testimony in favour of shade has come almost entirely from Central America, Venezuela and Columbia where it is the custom to plant leguminous trees with coffee. In Brazil and the East Indies where experiments have been made with figs and other non-leguminous trees, theory and practice are generally opposed to the use of shade. These contrary ideas can be reconciled if we consider that the coffee and cacao planters of the Central American region have been practising, unconsciously, a system of soil fertility just as have the agriculturists of temperate regions when employing leguminous crops like clovers and vetches in their rotations. Unless this explanation is the correct one, it is difficult to understand why shade trees should be so presistently planted in moist tropics like Central America. The value of the point of view of shade put forward in this bulletin like that of any theory whatever, lies in the experimental work to which it gives rise. If experiments are set on foot to test, quantitatively, the value of leguminous shade trees, and to find out that degree of shade which gives the best results from the planter's point of view, this bulletin will have served its purpose. What is wanted in this question are scientifically planned experiments on a sufficiently large scale to satisfy practical men to determine the exact point when the benefits derived from the nitrogen-collecting bacteria in the root nodules of the shade trees are greatest without unduly diminishing the crop by cutting off too much light from the coffee or cacao trees. Too dense shade would seriously diminish the crop by interfering with assimilation. Too little shade would not give the requisite amount of nitrogen to the soil. In other words, an answer is required to the question—How much shade gives the best results? The answer can only be given by experiments.

The bulletin concludes with a list of the shade trees in use in the tropics with notes on the more important ones. To Experiment Station workers and to all interested in the question of shade in tropical agriculture, we recommend this work for careful study as an able and comprehensive treatise on the subject.

Rubber Planting in Ceylon.

The following extract from the Report for 1901 of the Royal Botanic Gardens, Ceylon, will be of interest to rubber planters in the West Indies. It shows that higher prices are being obtained for carefully prepared Hevea or Para rubber grown in Ceylon than for the best samples of South American Para rubber:—

India rubber may now be regarded as established as a minor product in the low-country, and an export of appreciable quantities of Hevea or Para rubber has begun; 66 cwt. valued at Rs. 11,986, were exported in 1901 to England. Being carefully prepared, this rubber is of excellent quality, and has sold for prices much exceeding those of the best Para rubber sold on the same market from wild sources. On one occasion 4*s.* 1½*d.* per lb. was received for good biscuit, against 3*s.* 9½*d.* for the best Para. A recent market report says: Ceylon sells with eager competition. The rubber is much liked, and in large quantities would bring high prices. Extension of planting continues in suitable districts, and probably 3,000 acres are now in rubber. In most cases the rubber is mixed with tea and planted by roads and ravines, and perhaps this is for most estates the most satisfactory method of planting under present circumstances.

Composition of Cassava.

The yield of cassava roots on well irrigated land may be more than 32,000 lb. per acre. The percentage composition of the roots (mean of six analyses) is as follows:—

Water	70·25
Starch	21·44
Nitrogenous matter	1·12
Crude fibre	1·11
Sugar	5·13
Ether extract	0·41
Ash	0·54

(Journal Chemical Society, May, 1902.)

WEST INDIES.

Hand-book of General Information.

The Emigrants' Information Office (31, Broadway, Westminster, S.W.) have recently published a new edition of their hand-book of general information for intending settlers in the West Indies. The following summary of the latest and most important details contained in it is quoted from the *Imperial Institute Journal*, May, 1902 :—

Firstly, with regard to general openings, the sugar industry comes under consideration. This however, requires capital and experience, and is mainly in the hands of large proprietors, most of whom have been long connected with the West Indies. All field labour, and nearly all artizan labour, is carried on by coloured workmen, who are better able than white labourers to work under a tropical sun. In British Guiana and Trinidad there are occasional openings for the employment of young men as overseers on the sugar estates, at salaries of about £40 to £50 per annum with board and lodging. Such men are required to be fairly educated, and men of the farmer class are usually found to be most suitable. In no case, however, should any young man go out, except under regular engagement. There is also occasionally, some opening for capable artizans and shop assistants, but they, too, will do well to obtain situations before going out. Persons possessing large capital will, no doubt, have the time and money to visit the West Indies and judge for themselves of their capabilities as a field for investment and a place of residence. Small capitalists with, say, £2,000 will find that these Colonies offer a fair prospect of making a comfortable livelihood, but they should first work for a year or two with some planter to learn the methods of cultivation. The industries for which the islands are suited are the cultivation of fruits, such as bananas, plantains, cocoa-nuts (by the sea coast), limes, oranges, etc., for all of which there is an increasing market ; and also tobacco, coffee, cacao, arrowroot, india-rubber, fibre-plants, spices, and in some islands (as in Jamaica) the raising of cattle, horses and mules. Intending settlers in Jamaica would do well to communicate with the Secretary of the Institute of Jamaica, from whom can be obtained particulars of a scheme of articling pupils in farming and planting, which is intended for young men with some £2,000 or £3,000 capital, who wish to adopt an agricultural career. A settler with enough capital to combine cattle and sheep-farming with fruit and other cultivation, should do well. Properties of 200 to 1,000 acres, with house, etc., would cost from £500 to £3,000 and upwards. The outlook for fruit growers has been considerably brightened since the starting of the direct line of steamers. Bananas yield large crops, and their cultivation requires less capital than most of the other crops, and is remunerative. Sugar has latterly fallen to a low position, the total value of the sugar-cane products exported during the last five years being little more than one-third of the value of bananas and oranges shipped to the United States. The cause of this depression of the sugar industry are not far to seek, and in so much as they are of local origin they are entirely remedial. There are perhaps, four sites in Jamaica at the present time where the erection of central factories fed from a clientèle of contiguous estates would enable sugar to be produced at a greatly reduced cost, but on the whole the majority of sugar estates in Jamaica are of sufficient size, agriculturally, to stand on their own merits and to be capable of individual development. The sugar district of Vere is being provided with a system of irrigation. The Government chemist considers that a capitalist seeking an outlet for his money in Jamaica could find no investment so safe, certain and remunerative, as a well-situated sugar estate managed on up-to-date lines, and with sufficient capital to work it economically.

It is observed that in the above review no mention is made of Dominica. The information in the hand-book of this island shows that, possibly, Dominica offers just now the best openings, if any, for young men with a capital of about £2,000, especially if they have previous knowledge of the tropics and take up Crown lands. These are obtainable at a very moderate price, but, naturally, are not so accessible as the coast lands.

HAND-BOOKS TO THE WEST INDIES.

The following Hand-books afford interesting information of a descriptive, statistical and general character respecting the West Indies. They also contain particulars respecting the imports and exports and the agricultural resources of the Colonies enumerated :—

Hand-Book of Jamaica for 1902, comprising Historical, Statistical and General Information concerning the Island. Twenty-second year of publication. London : Edward Stanford, 26 and 27 Cockspur Street. Jamaica : Government Printing Office, Kingston.

British Guiana Directory and Almanack for 1902. Georgetown, Demerara : C. K. Jardine.

Trinidad and Tobago Year Book, 1902. Thirty-seventh year of issue. Compiled by James Henry Collens. Port-of-Spain : Muir, Marshall & Co.

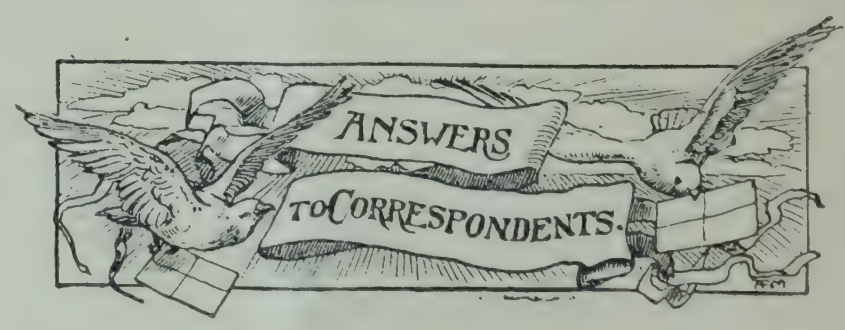
The Mirror Almanack and General Commercial Directory of Trinidad and Tobago. Port-of-Spain : Mole Brothers.

The Grenada Hand-book, Directory and Almanack for the year 1902. Compiled by the Colonial Secretary. London : Sampson Low, Marston & Co., Ltd.

The St. Lucia Hand-book, Directory, and Almanac for 1902. Compiled by Everard G. Garraway, Castries, 1902.

The Barbados Directory and West Indian General Advertiser, 1901. Compiled by S. J. Fraser. Bridgetown Barbados : King & Co.

Lightbourn's West Indian Directory and Commercial Directory. J. N. Lightbourn, St. Thomas.



Mr. C. K. Gibbons, Collynns, St. Lucy, Barbados, offers seedlings of the 'Queen of Flowers', *Lagerstroemia Flos-reginae* in exchange for ornamental shrubs, Petrea, Arbor-Vitae, shaddock, etc.

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is desirable that inquiry be made, beforehand, as to the terms on which such produce will be received, and whether the market is favourable or not.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—
B. S. Bayley, Water Street, Georgetown.

TRINIDAD—
J. Russell Murray, Port-of-Spain.

BARBADOS—
T. S. Garraway & Co., Bridgetown.

ST. LUCIA—
Captain H. Henville, Contractor and Agent, Castries.

MARKET REPORTS.

London,—June 10, 1902.—Messrs. J. Hales Caird & Co., and Messrs. Gillespie Bros. & Co.

Balata—Demerara sheet 2/4 per lb.
Bees-wax—Jamaica, £7. 12. 6. to £8. per cwt.
Cacao—Trinidad, dark to fair red 60/6 to 63/- ; good to fine red 64/- to 70/- per cwt.
Grenada, dark red, 58/6 ; good to fine 61/6 to 64/- per cwt.
Jamaica, fair ordinary, 50/- ; good red fermented 57/6 to 61/- per cwt.
Dominica, fair 53/- to 55/6 per cwt. : good 56/- to 59/- per cwt.
Coffee—Jamaica, good ordinary 35/- to 35/6; good bold 60/- to 66/- per cwt.
Costa Rica, smalls 45/6 to 53/6 ; bold 71/- to 92/6 per cwt.
Peaberry 59/6 to 90/6 per cwt.
Cotton—Carriacou, $5\frac{1}{16}$c. per lb.
Ginger—Jamaica, good middling 45/- to 48/- ; common 34/6 to 36/6 per cwt.
Honey—Jamaica, bright pale amber 17/6 to 24/- ; dark 15/- to 18/6 per cwt.
Lime Juice—Raw, 1/- to 1/5*d* per gallon ; Concentrated, £12. per pipe.
Mace—medium to good pale 1/2 to 2/6 per lb.
Nutmegs—Shelled, 140*s* to 80*s* 7*d* to 1/3*d*. ; 80*s* to 60*s*. 1/3 to 2/4 per lb. In shell 5*d* to $6\frac{1}{2}$*d* per lb.
Oil of Limes—Distilled 1/2 per lb. ; Hand pressed 4/- per lb.
Pimento—$2\frac{7}{8}$*d*. per lb.
Sarsaparilla—no quotations.
Sugar—Muscovado 12/6 to 12/9 ; Crystallized 13/- to 14/9 per cwt.
Tamarinds—no quotations.
Logwood—Jamaica quiet.
Fustic—Jamaica quiet.
Fruit—Covent Garden Market (Gardener's Chronicle, May 31, 1902.)
Bananas—6/- to 10/- per bunch.
Lemons—7/6 to 20/- per case.
Mangos 4/- to 6/- per dozen.
Oranges—15/- to 20/- per case.
Pines—3/- to 4/- each.

New York, May 29, 1902. Messrs. Gillespie Bros. & Co.

Bananas—Jamaica, 9 hands $1.25 to $1.30, 8 hands 90c. to 95c., 7 hands 60c. to 65c. per bunch.
Cacao—African $12\frac{3}{4}$c. to 13c. ; Caracas. fair to good ordinary 14c. to $14\frac{3}{4}$c. ; Jamaica, good fermented $11\frac{3}{4}$c. ; Grenada 13c., Trinidad 13c. to 14c. per lb.
Cocoa-nuts—Jamaicas, $20.00 per M. ; Small Trinidads $12.00 per M.
Coffee—Rio, good ordinary $5\frac{5}{8}$c. ; Jamaica ordinary $5\frac{3}{4}$c. to 6c., and good ordinary $6\frac{3}{4}$c. to 7c. per lb.
Ginger—$8\frac{1}{4}$c. to $8\frac{3}{4}$c per lb.
Pimento—6c. per lb.
Rubber—Nicaragua Scrap $51\frac{1}{2}$c. to 52c. per lb ; sheet 46c. to 47c. per lb., Guayaquil Strip 49c. per lb.
Sugar—Muscovado, 89°, $2\frac{7}{8}$c. to 3c. ; Centrifugals, 96°, $3\frac{13}{32}$c per lb.

INTER-COLONIAL MARKETS.

Antigua,—June 18, 1902.—Messrs. G. W. Bennett, Bryson & Co., Ltd.

Molasses—8c. per gallon, package included.
Sugar—Muscovado $1.25 per 100lb., nominal.

Barbados,—June 21, 1902.—Messrs. T. S. Garraway & Co.

Arrowroot—good quality, $3.50 per cwt.
Cacao—$13.50 per cwt.
Coffee—Jamaica and ordinary Rio $10.00 and $9.50, respectively.
Eschalottes—12c. to 14c per lb.
Hay—lotting $1.20 per 100lb.
Manures—Nitrate of Soda $60.00 per ton
Sulphate of Ammonia—$75.00 per ton.
Molasses—8c. per gallon and $4.00 for package.
Onions—Bermuda $1.80 per 100lb. ; Stringed at $2.14 per 100 lb.
Potatos—Bermudas $3.25 per barrel.
Rice—Ballam $4.90 per bag ; Patna $3.75 per bag.
Sugar—in hogsheads, 1.07\frac{1}{2}$ per 100lb. and $5.00 for hogshead ; in bags 1.27\frac{1}{2}$ per 100lb.

British Guiana,—June 19, 1902.—Messrs. Weiting & Richter.

Arrowroot—$6.50 per barrel.
Cacao—native 11c. to 12c. nominal.
Cassava Starch—$6.00 to $6.50 per barrel.
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica 12c. to 13c. per lb. (retail.)
Eddoes—$1.56 per 100lb.
Onions—string $3\frac{1}{2}$c. per lb.
Pea Nuts—American $4\frac{1}{2}$c. to 5c. (retail.)
Plantains—16c. to 32c. per bunch.
Potatos English—$4.00 per barrel.
Rice—Ballam $4.80, Patna $5.60 per bag.
—Creole Rice 20c. per gallon, (retail.)
Sweet Potatos—Barbados 8/- per 100lb.
Tannias—$1.20 per 100lb.
Yams—10/- per 100lb.
Molasses—Vacuum Pan yellow 16c. per gallon, casks included.
Sugar—Dark Crystals $1.66 ; yellow $2.15 to $2.30 per cwt.
Timber—Greenheart 32c. to 40c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—June 18, 1902.—Messrs. Gordon Grant & Co. and Messrs. Edgar Tripp & Co.

Cacao—$13.35 to $13.50 per cwt.
Balata—37c. to 39c. per lb.
Coffee—Venezuelan $7\frac{1}{4}$c. per lb.
Onions—$2.25 to $2.50 per 100lb.
Potatos English—$1.50 to $1.90 per 100lb.
Rice—Yellow $4.50. White Table $5.75 per bag.
Sugar, Crystals—$1.75 to $3.25 per 100lb.
Molasses—no quotation.

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London: Messrs. Dulau & Co., 37, Soho Square, W. *Barbados:* Messrs. Bowen & Sons, Bridgetown. *Jamaica:* The Educational Supply Company, 16, King St., Kingston. *British Guiana:* The 'Daily Chronicle Office, Georgetown. *Trinidad:* Messrs. Munro, & Co., Frederick St, Port-of-Spain. *Tobago:* Mr. C. L. Plagemann, Scarborough. *Grenada:* Messrs. F. Marrast & Co., 'The Stores,' St. George. *St. Vincent:* Mr. W. C. D. Proudfoot, Kingstown. *St. Lucia:* Mr. R. G. McHugh, Castries, *Dominica:* Messrs. C. F. Duverney & Co., Market St. Roseau. *Montserrat:* Mr. W. Llewellyn Wall, Plymouth: *Antigua:* Mr. F. Forrest. St. John's. *St. Kitts:* Messrs. S. L. Horsford & Co., Basseterre

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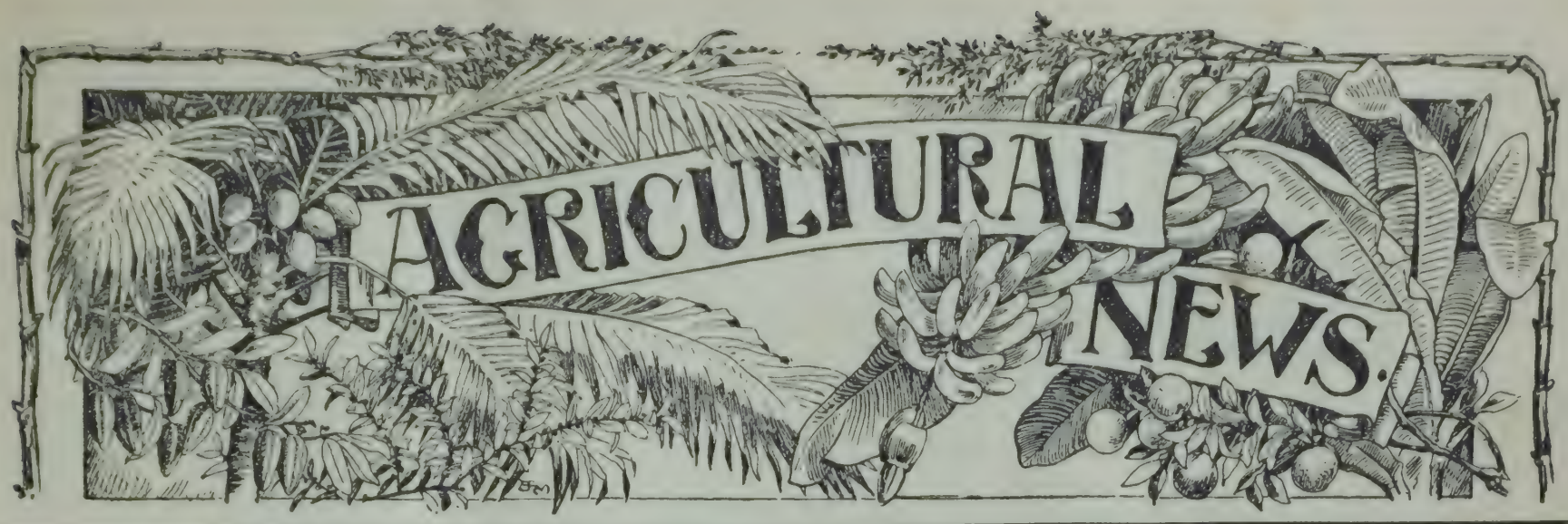

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. I. No. 7. BARBADOS, JULY 19, 1902. PRICE 1*d*.

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Agricultural Education.

IN spite of a good deal that has been written on the subject there still appears to be some mis-apprehension as to what is really meant by Agricultural Education in Elementary Schools. In the strict sense of the term there can be no teaching of Agriculture, or what is called farming, in elementary schools. What is proposed to be done is to carry out a scheme of elementary instruction by means of object lessons and class reading whereby the children will be drawn to take a deep and abiding interest in the phenomena of air, soil and water, and in the life of plants and animals around them and led, step by step, to exercise their powers of observation and reason from cause to effect in watching the events of every-day life that environ them. This, it is admitted, can only be done in a thoroughly interesting and effective manner by teachers who have themselves been carefully taught, beforehand, and who possess not only a grasp of details but adopt the right methods of presenting these details so as to really educate (that is, draw out) and not cram the minds of the children.

In the higher classes the lessons will naturally deal with a higher range of subjects, and the lessons given in class will be illustrated by means of plants grown in pots and boxes and by practical work in school gardens. Such a scheme, as is out-lined above, contains all that is proposed to be included under the term of Agricultural Education in elementary schools. Already, all that is possible, is being done to train the teachers and furnish them not only with a correct knowledge of the subject, but also with the best methods of teaching so as to win the sympathy and interest of the children. Agricultural Teaching, started and consistently carried out, on these lines must eventually change, to a large extent, the character of the present teaching in elementary schools; and

the change, we are convinced, will be entirely in the direction of brightening school life, in correcting current ideas in regard to agricultural matters and in placing the prosperity of these Colonies on the solid basis of the intelligence and active co-operation of the people.

TRADE BETWEEN WEST INDIES AND WEST AFRICA.

POSSIBLE NEW MARKET FOR MUSCOVADO SUGAR.

At a recent meeting of the Barbados Agricultural Society a letter was read from a merchant in Senegal, West Africa, suggesting that the principal firms in Bridgetown might agree to export, as an experiment, a shipload of muscovado sugar to West Africa where, he stated, there is a very good market for sugar, and that West Indian sugars could be regularly placed at the Gambia, Sierra Leone, Liberia, Lagos, Nigeria and the Congo.

The suggestion that the West Indies might find a remunerative market for some of its sugar in West Africa reminds us that the subject is not entirely new for it had already been discussed by Sir Robert B. Llewelyn, Governor-in-chief of the Windward Islands, when he was Administrator of the Gambia in 1899. The following extract is taken from the *Report on the Gambia Blue Book for the year 1898.* (Colonial Reports, Annual, 254):—

No muscovado sugar is imported, but I am sure it would be appreciated by the natives to mix with their 'pap'—a preparation of pounded corn—if it could be obtained in handy packages. Sugar packed in bagging gets moist in this damp climate in lightly constructed native huts; but I think if it could be put up in tins or kegs, which could be retailed here at a dollar or two dollars a package, it would take.

The merchants here would expect to get double their invoice price. Could ten pounds of good clean muscovado sugar be packed in tins or small kegs and delivered here for one shilling and eight pence?

I may, perhaps, also mention, as a requirement in Africa, salt—which one small English colony in the West Indies produces of an excellent quality. The salt at present imported here is made by solar evaporation in the Cape Verde Islands. It is not to be compared with Turks Islands salt for purity, and I believe the latter could be sold as cheap or cheaper.

What is wanted, is to connect the West Indies and the West Coast of Africa by direct steam communication.

Many common articles of food in the West Indies, such as salt, fish, and cornmeal, would, if they were introduced on the West Coast of Africa, be as popular there as they are with their kinsfolk in the West Indies.

I believe, too, in the course of time the inhabitants would pass to and fro, as they would not on the voyage have to leave a tropical climate, which many now dread. Such a steam service would not pay at first, but it should in a reasonable time, if carefully managed.

Great advantage, too, would accrue if some of the better mechanics, such as engine-drivers for steam launches, men who have been trained in the working of machinery on sugar estates, carpenters, masons, painters, blacksmiths, and even schoolmasters and native clerks could be induced to come to the West Coast of Africa; and I think they would if transport was easy and cheap, for they could cross as deck passengers in a voyage that would be entirely performed within the tropics. Perhaps all the colonies in the West Indies as well as those on the West Coast of Africa might for a few years contribute a small subsidy to a steamship company.

Sir Robert Llewelyn's suggestion is a valuable one and deserves careful consideration. It is probable that a line of steamers starting from New York and calling at one or more of the sugar islands in the West Indies would be the means of establishing a considerable trade between the West Indies and West Africa. In fact it is not impossible that if the matter were taken up with energy and enterprise, the bulk of the muscovado sugar produced in these islands might find a remunerative market amongst the teeming millions of West Africa.

PROPOSAL FOR STUDY OF MANUFACTURE OF JAMAICA RUM.

The following circular has recently been sent to the managers of sugar estates and others interested in the manufacture of rum, by Mr. H. H. Cousins the Agricultural Chemist of Jamaica:—

Sir,—I have the honour to request your opinion upon the following proposal which I intend to submit to the Board of Agriculture:—

'That a specialist in *Fermentation* be appointed by the Government, on a three years' contract, to co-operate with the staff of the Government Laboratory in the study of the conditions of manufacture of *Rum* in Jamaica; in the investigation of means of increasing the yield and improving the quality; in the study of the types of yeast operating in successful and unsuccessful fermentations, and the practical application of such information.

This Officer to be further available for training Distillers in improved methods of management and control as a branch of the Agricultural Education work to be started at the Government Laboratory.'

Mr. Cousins reports that twenty-seven replies were received, twenty-four approving and three expressing disapproval of the scheme. He adds: 'There is a powerful weight of opinion in favour of improving the still-house management in Jamaica. The rum crop is worth £150,000 a year, and an increase of 25 per cent. on this is a very moderate view to take of the possibility of improved control and management.

'We understand that Mr. Steele [the Expert recently sent out by the Home Government] is impressed with the crude and empirical manner in which the fermentation was carried out in Jamaica still-houses. Mr. Hoskins states that the losses on "Rum" estates in Trelawny are frequently enormous and should be avoided by more accurate and intelligent control. It is proposed to appoint a Chemist with special training in fermentation and bacteriology, and some experience in a distillery, and to get him to study the problem by residence on estates during crop time. The Laboratory staff would assist in the chemical work. Eventually, when "conditions" have been established, special courses for training distillers would be given under the scheme of Agricultural Education authorized by the Government.'

SWEET POTATOS FOR EUROPE.

INTERESTING EXPERIMENT.

As already announced in the *West Indian Bulletin*, Vol. II, pp. 301-2, on the suggestion of Sir Frederic Hodgson, the Governor of Barbados, efforts have been made by the Imperial Department of Agriculture to find an opening for the surplus supply of sweet potatos in the island by shipping them to Europe. The matter was actively taken up in the autumn of 1901, and since October last, regular shipments have been made by every mail steamer. In order to overcome the difficulty encountered in attempting to introduce a new vegetable, due to a want of knowledge of how to cook it, an attractive pamphlet was prepared suggesting fifteen different ways of preparing sweet potatos for table use. Several thousand copies of this have been distributed.

The results of one set of trial shipments from October 1901 to May 1902 are contained in a letter just received from Mr. J. R. Bovell, the Superintendent of the Botanic Station, who has taken a deep interest in the matter. Mr. Bovell wrote to the Commissioner of Agriculture on the 10th instant, as follows:—

> I forward a memorandum on the results of the forty barrels of sweet potatos shipped to Messrs. James Philip & Co., of London, towards the close of the last and the beginning of this year.
>
> As you will observe, the results are so far satisfactory. The average profit derived from shipping the potatos was $18·58 per acre more than would have been obtained for them if sold locally; or an increase of $56·64 per cent. The average expenses per barrel of potatos, including digging, packing, cooperage, carriage, lighterage, and freight, was $1·06; and the average profit per barrel, after deducting the cost of potatos and the expenses, was 50 cents (2*s* 2*d*).
>
> As showing what an additional gain of $18·58c per acre would be considered in some countries, I append the average gross value, per acre, of some of the principal crops in the U.S. of America, for the ten years 1891 to 1900 inclusive, viz: Indian Corn, $7·98.; Wheat, $8·43.; Oats, $7·04. and Barley $9·55.

The results of a second set of shipments will be published later. It is evident, however, that, if taken up on right lines and carefully and judiciously pursued, the prospects of finding a favourable market for sweet potatos in Europe are practically assured. During this year, owing to the low price of sugar, large areas have been planted in sweet potatos at Barbados. It is hoped that the planters will do all they can to follow up the experiments initiated by the Department of Agriculture, and that they will be successful in establishing a market for sweet potatos in Europe and so help to tide over a serious crisis in the history of the island.

CITRATE OF LIME.

PRACTICAL DEMONSTRATION AT DOMINICA.

On Saturday, May 24, Mr. Watts gave a demonstration at the Bath estate, Dominica, of the process of making citrate of lime on a commercial scale, for the information of those interested in the lime juice industry in Dominica. Mr. Frampton, the manager kindly placed the works and appliances at Mr. Watts' disposal and gave very valuable assistance in carrying out the experiment.

Three hundred gallons of lime juice were heated nearly to boiling point in an extemporized steam pan, the juice was then neutralized with chalk and the heating continued until the precipitated citrate of lime was crystalline. Filtration was effected by means of strong twill cotton bags supported within strong canvas covers. These, though acting efficiently as filters, did not permit of such efficient washing of the citrate as was desirable.

When well drained the wet citrate was removed to the cacao drier in the Botanic Station and thoroughly dried. (For description of this drier see p. 19.)

There were two points which could not be readily demonstrated. The first was the proper washing of the citrate with hot water. The second was the removal of a large proportion of the water from the citrate by pressing it before putting it in the drier. Efficient pressing will materially shorten the drying process.

The citrate, when dry, was of good colour, being nearly white; it was quite crystalline and thus was readily wetted and diffused through water. On analysis at the Government Laboratory for the Leeward Islands it was shown to contain 70·6 per cent. of citric acid, and to contain no carbonate of lime (free chalk). When boiled with water it did not impart any dark colour. In all respects it appeared to be a satisfactory commercial sample of citrate.

Its value depends on the price of concentrated juice. If the price of concentrated juice is

£17	per pipe,	the	sample	is	worth	£3	2	6 per cwt.
£15	"	"	"	"		£2	15	2 "
£13	"	"	"	"		£2	7	9 "

There was a good attendance of planters and others during the demonstration: they all appeared to be highly interested in the process and in Mr. Watts' explanation of the various operations.

Unusually heavy rains fell during the progress of the work, but this, except for the inconvenience caused, in no way rendered the process of drying the citrate difficult. It is interesting to observe this, for it has sometimes been asserted that it will be difficult to make citrate in Dominica and other West Indian islands because of the damp climate. The present experiment clearly showed that there is no ground for this suggestion.

WEST INDIAN FRUIT.

SERIOUS PEST OF THE ORANGE IN JAMAICA.

THE FIDDLER OR MAY-BUG.

Mr. H. H. Cousins, the Agricultural Chemist of Jamaica, has contributed the following notes on this pest :—

It must be admitted that this pest *(Praepodes vittatus)* commonly known as the 'Fiddler,' and in some districts in Jamaica as 'May-Bug,' is one of the most serious obstacles that the orange grower has to face in Jamaica. This is more particularly so with budded fruit. We know of large plantations of budded oranges just coming into good bearing, where losses that can only be described as disastrous are taking place from the ravages of the larvae of *Praepodes*.

The trees, from a state of perfect health and vigorous growth, suddenly stop growing, the terminals turn yellow and, gradually, death sets in. Defective drainage and starvation were the general explanation, and one proprietor wasted much money in applying chemical manures on the basis of this theory. A recent visit to one of these orange groves convinced us of the real cause and author of the damage. Trees in various stages of injury were dug up and in every case the roots had been girdled and larvae found *in situ*. In one case where negroes cultivated produce between the trees, the soil was so loose that a stick could be pushed 2 feet into it without difficulty. Adults were found at a depth of 2 feet. Specimens of these roots are being sent to the Imperial Department of Agriculture by this mail.

This year the beetles have been found in thousands defoliating the orange trees. One grower was catching 6,000 per day, another was paying a fixed rate per pint of 'heads.' Carbon bisulphide injections have been found of some apparent benefit as a means of destroying larvae. The abandonment of inter-cultivation has also been found of benefit as it is then less easy for the pest to enter the soil. Deep planting is also contributory to disaster. If a deep planted tree be girdled it cannot recover, whereas a surface rooting system appears capable of considerable recuperation even when serious damage has been done.

War against the adults seems to be the best policy. We should be glad of the advice of the Department in this matter, and a personal visit by the Entomologist would be welcome.

ST. VINCENT ARROWROOT.

A sample of St. Vincent arrowroot was recently submitted to the Imperial Department of Agriculture. It was examined at the Government Laboratory Barbados, and the Island Professor of Chemistry has, forwarded the following report :—

COMPOSITION :

Moisture	14·66	per cent.
Starch	85·16	" "
Ash	·08	" "
	99·90	

'This is a pure sample of excellent whiteness : it has been prepared with care and consists entirely of the starch granules of arrowroot.'

CACAO.

IMPORTATION FORBIDDEN AT TRINIDAD.

A proclamation has been issued by the Government of Trinidad prohibiting 'the importation into the Colony from any part of the Mainland of South America of cacao plants or of any portions of such plants and of all parts or portions of any cacao tree other than the cured beans thereof from Venezuela or Colombia.' Similar proclamations have already been issued at Dominica and St. Lucia. (See *Agricultural News*, pp. 14 and 38.)

MANIOC OR CASSAVA FLOUR.

The Imperial Institute, London, has forwarded to the Department the following note received from Messrs. W. & C. Pantin, 147, Upper Thames Street, London E.C., which may be of interest to West Indian planters and exporters :—

COARSE MANIOC. What we are looking out for is a coarse, very cheap, manioc flour for manufacturing purposes, and we have already had some offered from Brazil which will come about £6 per ton c. f. i. Hamburg. If you have anything in this line to offer us, will you kindly send us samples, and we shall be very glad to work up a business, and we think the quantities would be large.

Sweet potato flour would answer equally well, the only difficulty is the price, it would probably not pay at less than £9 per ton.

VANILLA.

Cultivation in the Seychelles.

(Continued from page 83.)

PREPARING THE VINES FOR CROPPING.

If the plants have done well they should be ready for such preparation in about eighteen months, more or less, according to the season. Formerly in this colony they were allowed to grow on until a spell of dry weather set in prior to the usual blossoming time. The growing ends were then cut off and all new shoots removed as they showed till flowers began to come or till the season for them was past. When the dry spell proved a long one, this seemed to answer pretty well; and, indeed, under these circumstances flowers would come in any case, whether growth was checked or not. But now it is more usual to stop the growing ends some nine or ten months, in the first instance, before flowering time. In the majority of cases the terminal bud will push, and this new shoot should also be removed when 5 or 6 inches long not earlier, else the next to the last bud is apt to grow.

After the second checking most vines will shoot far enough back to allow of the shoots being left. These grow on for the next year, and then stopped branches hang down with their lower ends a good foot or more from the ground, being generally from 4 to 6 feet in length, according to the heights of the forks through which they are hung and the positions of the new shoots, though these generally spring just before the last bends of the checked branches, which are to be the cropping parts. The new growths behind these are supposed to drain them of their sap, and thus conduce to flowering. However that may be, these checked hanging branches have certainly more tendency to flower than other parts of the vines. Flowers take some six weeks to develop from the moment they burst through the buds to their time of opening, but this period varies in length with the weather, continuous dryness retarding and moderate showers hastening their development when once started.

The growing branches of vines should now be checked again for the following year's crop. These will be less troublesome in putting out inconvenient shoots, as the plant's sap is more apt to go into flowering branches, when nourishment is now more needed. Could the whole work be performed in a few days, this change in the direction of sap flow should be done preferably ten days or a fortnight before flowers begin to open. In a large plantation, unless the hands are very numerous or the shoots have been arranged beforehand so that there is little else to do than cut their ends, it will take some weeks to accomplish this, and therefore work must begin earlier or finish later. If the dry spell necessary for flowering has lasted a good while and can fairly be depended upon to continue long enough, the growing ends may be cut earlier; but it must be borne in mind that if rain in quantity comes too soon and, in addition to the stimulus given by it, the branches intended for flowering have also the sap from previously growing shoots poured into them, the chance of their cropping well will be much diminished. Many a promise of a fine crop is ruined by too early rain here. The country, climate, and the planter's skill as a weather prophet must govern this undertaking.

An abundant supply of leaf mould should be in readiness for laying on the roots at this season, and should be applied when flowers begin to open, or a little before. If previous dressings have been so timed that vines are in a somewhat starved condition when flowering is expected, the chances of a good blossoming are increased, but this practice needs judgement, or a poor quality of pods will be the result.

There used to be a story current here, no doubt with some grain of truth in it, to the effect that in a very wet season the only vanilla planter who had any crop was one whose pigs had got adrift in his plantation and spent the night in grubbing up vanilla roots. This method of producing flowers is not recommended, but it is quite possible that careful and systematic root pruning might be carried on with advantage in wet years, if one could tell beforehand when these were coming.

(To be continued.)

ARBOR DAY.

PLANTING TREES AT ST. VINCENT AND TOBAGO.

Notwithstanding the postponement of the Coronation Ceremony, June 26 was observed in St. Vincent and Tobago as an Arbor day. At St. Vincent, Mr. Henry Powell, the Curator of the Botanic Station, reports that tree-planting was duly carried out at Government House, the Botanic Station and Agricultural School and similar commemorative trees were planted in the market places at Kingstown, Calliaqua and Barrouallie, and at the residences of several private individuals. Altogether, 59 trees were planted at St. Vincent. More trees, Mr. Powell states, would have been planted, had not the general conditions of the island been upset by the recent volcanic disturbances.

At Tobago a bed was prepared in the centre of the Botanic Station and planted on that day with a group of Cabbage Palms and ornamental shrubs. A Cabbage Palm was also planted at Government House and another at Fort Hill. At the latter place, the function took place in the presence of the Warden, the Curator and a large gathering of school children. To the latter was explained the object of the ceremony. Altogether 21 trees were planted at Tobago.

At Barbados, also, a few commemorative trees were planted; but the majority of the trees have, we understand, been retained to be planted on the actual Coronation Day. In supporting the idea of establishing an Arbor Day for the West Indies, Mr. Fawcett, the Director of the Botanical Department, suggests that at Jamaica, Victoria Day (May 24) being a recognised public holiday might be a convenient day for the purpose. Mr. Fawcett adds 'there are numerous occasions which would be fittingly marked by the planting of trees such as children's birthdays, the visit of friends, the anniversaries of national or local important events. But no one should undertake to plant a tree unless it is fully intended to take care of it afterwards, otherwise it will remain a monument of careless indifference. A list of available plants at the Jamaica Gardens is published in the *Gazette*. But if there is likely to be a universally observed Arbor Day, it would be well to give notice some months beforehand of the plants required. The Government is willing to help all interested in the movement.'

It would be interesting to learn what was done, or, what is intended to be done, in regard to an Arbor Day in other Colonies.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the **Commissioner, Imperial Department of Agriculture, Barbados.**

It is particularly requested that no letters be addressed to any member of the staff by name. Such a course may entail delay.

Communications should always be written on one side of the paper only. It should be understood that no contributions or specimens will, in any case, be returned.

All application for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on the last page of this number.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Cases for holding the numbers of the *Agricultural News*, with gilt lettered, leather backs, may be obtained from the 'Advocate' Office, Bridgetown, Barbados. Price 2*s*. Post free 2*s*. 4*d*.

Agricultural News

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NOTES AND COMMENTS.

Grape Fruit

In the Exports of Jamaica for the year 1901 (p.92) grapes were, by accident, inserted instead of grape-fruit. So far as we are aware grapes, although more widely cultivated in Jamaica than formerly, have not yet been exported in appreciable quantities. On the other hand the grape fruit (a highly esteemed variety of the shaddock) has been a recognised article of export for many years, sometimes, amounting to the value of £10,000 per annum.

Toronto Exhibition 1902.

The arrangements for this great Canadian Fair to be opened at Toronto at the end of next month are advancing rapidly. We learn that the products of British Guiana, Trinidad and most of the West Indian Colonies are likely to be well represented. Messrs. Pickford & Black, Limited, are doing all they can to assist by the free transist of exhibits and they will, also, arrange them attractively in their places. The last opportunity for shipping cured produce, intended for this Exhibition, will be by S.S. 'Ocamo' as follows:—Demerara, July 25; Trinidad, July 26; Barbados, July 29; St. Vincent, July 30; St. Lucia, July 30; Dominica, July 31; Montserrat, August 1; Antigua, August 2; St Kitts, August 4. Further information may be obtained from the Agents of the Pickford & Black Steamship Company, Limited, in each Colony.

Bird Migrants in the West Indies.

The season is fast approaching when the large annual flight of bird migrants, plover, teal, snipe, duck etc., will be passing over these islands. It is stated that about forty species appear at Barbados between the beginning and end of August, but they merely alight here on their passage to some distant land. If a southerly wind and rain prevail they are said to rest a short while, whereas fine weather tempts them to continue their flight. The birds no doubt are migrants from the mainland of North America and they appear to fly, especially during fine weather, to the east. That would bring them to the coast of West Africa; but there is no doubt a large number, possibly the bulk of them, travel south to the mainland of South America. A fairly complete list of the bird migrants that visit these islands would be an interesting contribution to the pages of this Journal.

Birds and Insect Pests.

It is observed that increased attention is being devoted in these Colonies to the protection of native birds, both ornamental and useful. Birds are admitted to be the most attractive and interesting members of our fauna and every effort should be made to increase their numbers. Amongst nations the care of bird-life for song and beauty is regarded as a sign of advancing civilization. Apart from the pleasure afforded by their presence many birds are valuable, if not essential, to our success in agricultural pursuits. The insect-feeding birds are the means of saving an appreciable share of our crops every year. The Barbados blackbird, to take a single instance, has been known to save a large field of sweet potatos from being destroyed by caterpillars, and the numerous fly-catchers tend to reduce within reasonable limits the plague of flies and beetles that otherwise would not only seriously interfere with our comfort but attack our fruit and other crops.

Ornamental Seeds.

There are numerous West Indian seeds of an ornamental character that deserve to be more widely known. The following are a few of the accessible sorts: Horse-eye beans, Nicker beans (grey, black, yellow, orange and white), Circassian beans, Crab-eyes, Coral beans, (red with black spots), Soap-berry, Job's tears, Mammee-apple seeds, Indian shot, Wild tamarind, Gru-gru, and Velvet seeds. The latter are somewhat rare and found only at British Guiana and Jamaica. The present age is one in which there is a great demand for curios and the increasing number of winter visitors to these Colonies should enable aged people, and those who are only able to follow light, sedentary occupations, to establish quite a small industry in mounting and preparing the ornamental seeds of the West Indies.

Budding and Grafting Fruit Trees.

The regular and permanent improvement of West Indian fruit of all kinds is a matter of the utmost importance. It is desirable, in these days, we should

steadily keep in view that to continue to grow from seed such fruits as mangos, oranges, avocado pears, sapodillas, guavas, star apples, and the various fruits known in the West Indies as plums and cherries is not only a waste of time and opportunity but it is a confession of our want of appreciation of the advantages to be derived from the skilful utilisation of our surroundings. It is hoped that at all Botanic Stations, Agricultural Schools and Experiment plots throughout the West Indies special attention will be devoted to budding and grafting fruit trees and that only budded and grafted sorts, of known merit, will be planted out at these institutions.

Saccharine Sales Restricted.

About sixteen years ago when the discovery of an artificial sweetening agent, termed saccharine, 250 times sweeter than sugar, was made there naturally arose a well-grounded anxiety amongst sugar planters to learn how far this new substance was likely to constitute a competitor with cane-sugar. When it was found that saccharine could not become a regular article of food and that its use, in cases where sugar was forbidden, was more or less injurious, the anxiety of the sugar planter was relieved. We now learn that a Bill has been passed in the Reichstag restricting the sale of saccharine in Germany to chemists' shops and to persons officially licensed to sell it. In fact, saccharine has finally passed out of the category of an article of diet into that of a drug to be used sparingly and only under medical advice.

Sweet Potatos for Europe.

As shown, elsewhere, in these pages it is established that there is a distinct demand for sweet potatos during the winter months in Europe. This demand is not large, at present, but if it were dealt with in an enterprising and skilful manner there is no doubt it would steadily increase and prove of considerable value to the West Indies. To suit the European market the potatos should be dug a few days before they are to be shipped and the skin allowed to get dry, they should be of sorts that are known to keep well without becoming soft or shrivelling; red-skinned potatos are sometimes preferred to white, and it may be added that none of the potatos should weigh more than about 12 to 20 ounces or be larger (or smaller) than the closed fist. The best package is the ordinary flour barrel with *small* holes drilled in the sides for ventilation. Large holes admit rats and other vermin.

Chinese Banana at Barbados.

In an account of the interesting experiment recently published in the *Agricultural News* (p. 68) of the trial shipment of bananas from Barbados it was pointed out that the fruit sent was not the usual West Indian kind (the *Gros Michel*) but the Chinese or dwarf banana so largely grown in the Canary islands and forming the bulk of the bananas now consumed in Europe. This fact is regarded as of great importance to the West Indies, 'because if the Chinese banana proves on trial to carry better than the other an impetus to the West Indian fruit trade should follow, because this is the fruit which is preferred in the London market.' Here is an excellent opening for Barbados to start a small fruit trade. The plant yielding the Chinese banana is already abundant in the island, it is low in stature and therefore not so liable to be injured by wind while the fruit not only carries well but is preferred in the London market to any other. If a few planters, with suitable land, would each plant 500 suckers during the present season, it would soon be possible to test the value of the industry. Mr. J. R. Bovell would be happy to afford information on the subject. To obtain large bunches, strong suckers should be planted, about 12 feet apart, in sheltered situations, with good soil.

Cotton Growing in the West Indies.

Cotton, at one time a staple product of the West Indies, has been almost entirely supplanted by the sugar-cane and is now grown on a commercial scale only at Carriacou. The Imperial Department of Agriculture has recently been conducting experiments with a view of testing the possibility of re-establishing a cotton industry at St. Lucia and Montserrat. Samples of cotton, grown, in these islands, were forwarded to the Manchester Chamber of Commerce in March last. The experts to whom they were submitted for examination report:—

We should value them as undernoted, though it would be advisable to take the values as more or less nominal, there having been no actual business in these descriptions of cotton for some time past. Most of the qualities, however, would fairly readily find buyers. Cotton of white colour is preferred to yellow cotton, and commands a higher price.

Sea Island	$7\frac{1}{2}d.$	Hawkins Prolific	$4\frac{5}{8}d.$—$4\frac{3}{4}d.$
King Improved	$4\frac{3}{4}$—$5\ d.$		
Upland	$6\ d.$	Native Montserrat	$5\frac{3}{4}d.$—$6\ d.$
Peterkin	$4\frac{1}{2}d.$		

Native Cotton (St Lucia) $4\frac{1}{2}d.$—$4\frac{3}{4}d.$

We think, with regard to the Sea Island, that this might easily fetch considerably more money.

The following extract from a recent issue of *The Times* indicates that the present moment is auspicious for successful efforts to revive a cotton industry in the West Indies:—

The 'shortage' of cotton which has caused prolonged short time in Lancashire promises also to bring about a resolute effort to promote the extension of cotton growing within the British Empire. An influential committee representing the Chambers of Commerce and the associations of millowners and mill hands was appointed some time back to consider the matter. Yesterday a well-attended meeting of the committee was held at the Manchester Chamber of commerce, at which resolutions were passed for the formation of a British cotton-growing association with a guarantee fund of £50,000 for inquiries and operations during the next five years. Important subscriptions were announced. Among those taking part in the movement are Mr. J. Thompson, president of the Manchester Chamber, Sir G. Cotton, Sir Alfred Jones, Mr. Musgrave (Bolton), Mr. Newton, vice-president of the Oldham Chamber of Commerce, Mr. Ashton, chairman of the Operative Spinners' Amalgamation, Mr. Hutton (Manchester), and Mr. Emmott, M.P.

WEST INDIAN FISHERIES.

Tarpon in Jamaica.

The information published in the *Agricultural News*, (p. 72) respecting Tarpon in Jamaica has been supplemented by some interesting notes, contributed by Mr. S. F. Moyes. It would seem that heretofore tarpon fishing had been confined to the rivers to which fishing parties periodically resorted and obtained good sport. Holland pond has now attracted attention and is likely to afford excellent fishing. Mr. Moyes writes:—

Holland pond is very deep. I have seen hundreds of tarpon 'freak' there whilst shooting crocodiles; but I only trawled for tarpon once: baiting or fly fishing I consider better. I have discovered that tarpon bite best in the early morning and in a rising tide: also fairly well in the evening, especially on rising water. I believe mullet bait the best and a kerb hook. Fishing parties here made a great mistake at first by using hooks too small and rods too light. The result was that, although many large fish, sometimes 15 to 30 lb. weight, were hooked, few were landed because they invariably broke the hooks or the rods and so escaped.

Our season here commences towards the end of March and virtually closes in August.

Dr. J. E. Duerden has kindly forwarded a copy of the following letter from Mr. Jas. H. Cox of Kingston, Jamaica, on the same subject:—

Observing the inquiry re 'Tarpon,' I may mention that the Yallahs pond has a large supply. I have very little time for fishing or other sport, but with an ordinary line, and bait of sea roach, I have hauled in on a Sunday morning, at my place, Mt. George, three monsters weighing 53, 58, and 44 lb., respectively. I have seen floating on the pond the halves of several which had been chopped in two by alligators, which appeared to me larger than those I caught. As I never indulge to any extent in fishing, I cannot say which are the best seasons, but very frequently I have caught (without any further trouble than baiting the hook and casting it into the ponds and fastening it to a stick stuck in the beach) large jacks, and once or twice calipevers. Snooks and jacks and alligators are plentiful in these ponds.

VOLCANIC DUST AT JAMAICA.

After the recent volcanic eruptions reports were received of dust falling in the highlands of Jamaica. Mr. H. H. Cousins, the Agricultural Chemist of that Colony, reports that he has received a sample from Mr. S. T. Scharschmidt, from Hanbury, Shooters Hill, Manchester. This was compared with a sample of the dust which fell at Barbados, forwarded to Mr. Cousins by the Imperial Department of Agriculture, and 'found to be indentical therewith in general composition. It was, of course, finer in grade, but was otherwise identical.'

GARDEN NOTES.

Recently while on a visit to Antigua there was noticed an interesting instance of the way the Sacred or Water Bean, sometimes, but incorrectly, called the Lotus, bean *(Nelumbium speciosum)* had established itself in a wild state in the island. This lovely plant with beautiful rosy flowers, on long slender stalks, had taken complete possession of a large pond on the right hand side of the high road leading from St. John's to Parham. The pond was some distance from any dwelling and was surrounded by long grass and brushwood. It is seldom that so striking and beautiful a picture is seen even in the tropics.

Fig. 9. Nelumbium luteum.
(From the *Dictionary of Gardening.*)

It is stated that this plant (a native of the East Indies) has, similarly, become wild in some parts of British Guiana. The yellow flowered *Nelumbium luteum*, a native of Jamaica and the Southern United States is cultivated at the Botanic Gardens at Dominica and elsewhere in the West Indies. We would be glad of notes of any other interesting foreign plants that are establishing themselves in these colonies.

The Banana leaf. The gigantic leaves of the banana when growing luxuriantly are one of the glories of the tropics. The large green leaf-blade is all in one piece and soft and pleasant to the touch. This indicates that the plant will grow best in fairly moist situations and where the air is still. When planted in windy places, the leaves of the banana soon become split up into strips. They cannot then perform their work to the best advantage. Consequently bananas do not thrive so well in windy situations.

SOUR-GRASS AND TICKS.

The grasses belonging to the genus *Andropogon* are remarkable for their aromatic constituents, and for this reason have but little value as fodder, being unpalatable to stock. One species, however, the Barbados sour-grass (*Andropogon pertusus*) constitutes an important fodder in Barbados, Barbuda and some other West Indian islands, as well as in many parts of the Old World. (See *West Indian Bulletin*, Vol. II, p. 238.)

Like its congeners sour-grass contains a notable quantity of aromatic substances. The Hon'ble F. Watts suggests that possibly, these aromatic principles may be of value in warding off the attacks of ticks, and of parasitic worms in the lungs and intestines, so commonly found infesting cattle in the West Indies.

Aromatic substances are rapidly diffused through the animal system and are excreted by the lungs, the skin and the kidneys. Arguing from the value as vermifuges of similar aromatic substances, as for example, turpentine, it is reasonable to conjecture that the aromatic substances present in sour-grass may be useful in the manner here suggested.

It would be interesting if stock-keepers would make observations to ascertain whether animals fed upon sour-grass are or are not equally liable to infection by ticks or worms, with animals fed upon non-aromatic fodder.

Jamaica offers a fine field for experiment in this direction: it would be comparatively easy to introduce Barbados sour-grass to the stock estates, and after feeding animals upon it for a season, to compare their condition with the animals fed upon the ordinary grasses.

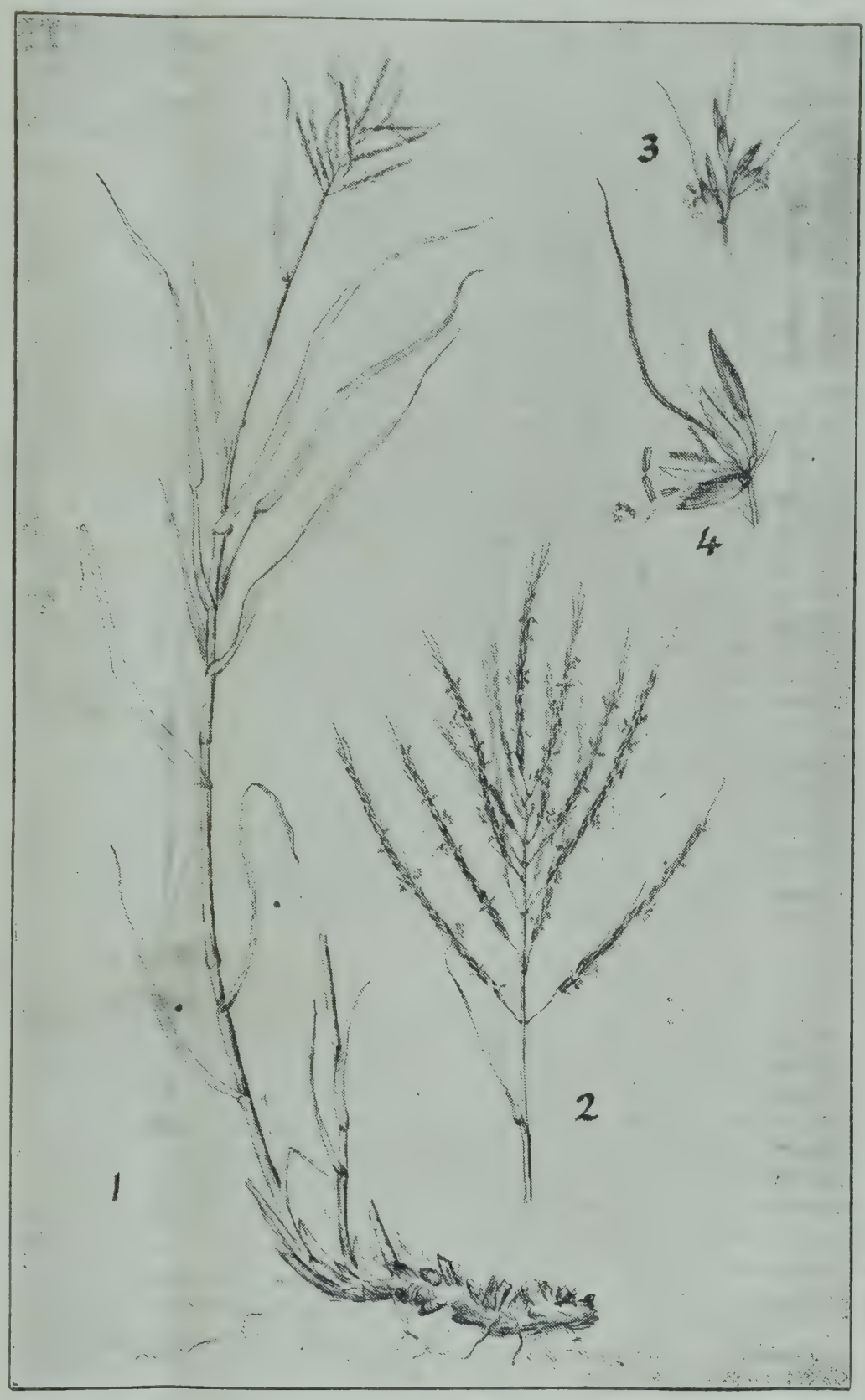


Fig. 10. Barbados Sour-grass.
(*Andropogon pertusus*, Wild.)
1. Whole plant (reduced). 2 Inflorescence. 3. Group of Spikelets. 4. Fertile and sterile flowers.

Owing to its aromatic character difficulty is sometimes experienced in getting animals to eat this grass, but the habit is acquired in time if other fodder is withheld. Young animals will perhaps be more readily induced to eat it than older ones. The point now raised is not the value of the grass as fodder, for that has long been determined by its extensive use in Barbados and elsewhere, but its value in preventing attacks of parasites of various kinds. That it has a value in this respect appears to be borne out by the following note by Mr. Oliver Nugent, Acting-manager Barbuda:—

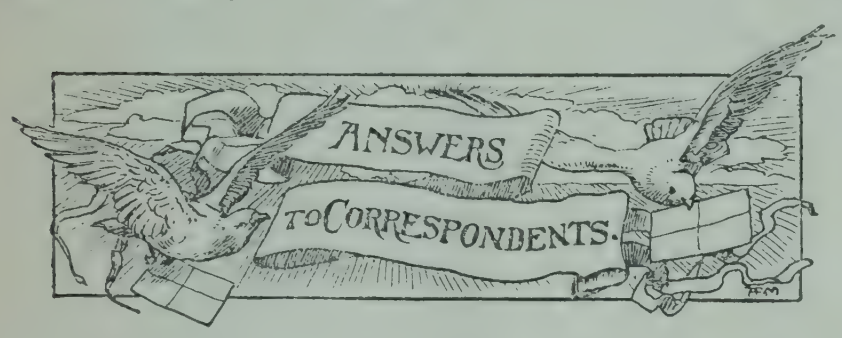
In Barbados the cattle and horses that feed continually on sour-grass keep in excellent condition and their skins are perfectly clean and free of ticks, while the horses kept on the estates and fed otherwise get covered with ticks and have to be caught and cleaned continually.

POULTRY.

Ticks on Fowls.

On page 74 of this Journal it was mentioned that a piece of skin, removed from a fowl's breast, covered with ticks, had recently been forwarded to this Department by Mr. C. W. Meaden, who was of opinion that these parasites were the cause of considerable loss of poultry. Referring to this pest Mr. Hart writes :—

This tick was described in the Trinidad *Bulletin* for April 1899. It is mostly nocturnal in its habits when mature, while in the primary stages it infests the skin of fowls. Mr. Meaden sent them to me for identification when he found them at Valsagn The tick has been sent to the Department of Agriculture, United States of America, and Prof. Howard has had it determined as *Argas* sp.—probably to be referred to a Guiana species. It kills fowls rapidly unless they are treated. We have found kerosene and cocoa-nut oil, equal parts, very effective. It is quite useless to burn down fowl houses alone, because the ticks are always sure to be on the fowls and will infest the next fowl house readily. The only plan is to destroy *all* the fowls as well as the fowl house.



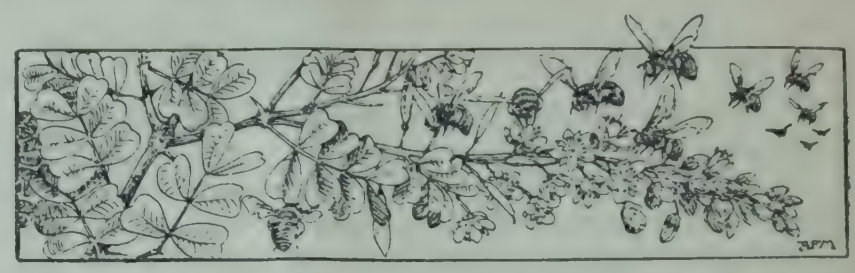
Referring to the query on page 90 concerning an imported Plymouth Rock rooster whose legs have become covered with scales, Mr. J. Barclay, the Secretary of the Jamaica Agricultural Society, writes:—

This is a common disorder among fowls, more especially those having Asiatic blood and yellow legs, as the Plymouth Rocks have, and it is termed 'scaly leg.' The rough warty scale may safely be picked off, and it does not matter if a little blood shows. Then the legs should be rubbed with kerosene and sweet oil, equal parts mixed.

It is a simple matter to cure when taken at an early stage, but when it is as bad as stated, it will take some little time before the bird is fit again. Give a dose of one teaspoonful of Epsom salts in water or soft food once a week, and do not feed corn for three weeks, but rather some dry rice, pigeon peas and household scraps.

Bats prefer Purple Grapes.

What appears an interesting case of bats preferring purple grapes to green kinds comes to hand from Montserrat. The Agricultural Instructor reports that the bats bit through and in some cases tore off mosquito netting bags placed over pure purple grapes at the Grove Station, whilst a little distance off green grapes not protected at all, ripened without molestation.



BEE-KEEPING.

Montserrat.

Satisfactory progress is reported from Montserrat of the bee-keeping industry in this island. A considerable increase has been made in the number of colonies, the number at the Experiment Station rising from eighteen to forty-four during the last three months. The principal source of honey is stated to be *Cleome*, a common weed, found every where and flowering a few days after rain. A considerable amount of honey was also gathered by the bees at Olveston Station from Logwood which remained in flower only a short time. On several occasions when the Alfalfa, a well-known American bee-plant has been in flower, the Italian and Black bees have altogether discarded it, though the little wild stingless bee worked actively on it.

Honey a Nutritive Laxative. Sir James Sawyer, the well-known physician, is never tired of dilating upon the virtues of honey. Addressing the members of the Warwickshire Bee-keepers' Association recently, he declared that honey was a nutritious food, capable of administering to every activity of the body and mind, of muscular action, and of resistance to cold and disease. If we consume ordinary sugar it has to be changed into glucose before we can assimilate it, but the bee has already done that for us with regard to the sugar-solution which it took from the flower. Besides being nutritive, honey is valuable as a laxative. *(Science Siftings.)*

Preserving Corn.

In the West Indies, as in most tropical countries, stored crops, especially cereals, are liable to the attacks of insects, which result in serious loss to the cultivators. A simple and inexpensive method of preserving corn, guinea corn, pigeon peas and all foodstuffs, from weevils and other insects is recorded in Pamphlet Series No. 5, (p. 26) issued by this Department :—

'Grain may be freed from weevils by exposing it for twenty-four hours in an air-tight receptacle, to the fumes of carbon bisulphide at the rate of one teaspoonful (1 drachm) per cubic foot of space. This will kill every insect within twenty-four hours and will not damage the grain. Carbon bisulphide is obtainable in cans from 7 lb. upwards at about 5*d*. per lb. in England or the United States. It may also be imported in 1 lb. or 5 lb. bottles more readily, though at a higher price. In Barbados the retail price is 2*s*. per lb. Benzene may be used in the same way, taking rather more per cubic foot as it is less powerful. As both these substances are very inflammable, care must be exercised in using them.'

EDUCATIONAL.

Agricultural and Science Education at Antigua.

The following appears in the *Antigua Grammar School Review* for June, 1902 :—

With the sanction of the Secretary of State the Imperial Commissioner of Agriculture for the West Indies has arranged to afford assistance to the Antigua Grammar School to enable it to maintain a regular course of instruction in elementary science and agriculture.

A Science and Agricultural Master from England will be provided by the Department, as also scholarships of the value of £10 for day scholars and £20 (about half the cost) for boarders.

These scholarships are tenable at the school and are open to boys in Antigua and Montserrat under sixteen years of age (preferably the sons of planters) whose fathers' income is not more than £150 per annum.

Particulars of these scholarships, and the subjects for examination will be published later. It is expected that the Science Master will arrive at Antigua at the beginning of the next term.

Agricultural Teaching in Elementary Schools.

The Education Board at Barbados has recently issued the following requirements for the Premium examinations in elementary schools during the year 1903 :—

OBJECT LESSONS AND NATURE TEACHING.

STANDARD I.

12 Simple lessons on common objects which must have been given during the year must be ready for the Inspector on his visit of examination. The teacher will be required to give a lesson on one of the subjects named before the Inspector, who will report to the Education Board on the manner in which the lesson has been taught and on the teacher's efficiency. Bat, Horse, Cow, Lizards, Frogs, Bees, Leaves, and Fruits of any six plants mentioned under Standard II (The children must identify the plants by their fruits and leaves, show use of fruits, etc.)

STANDARD II.

12 Simple lessons on Plants and Animals to be given. These must be illustrated as far as possible by specimens, diagrams and blackboard. The teacher will be asked to explain a reading lesson, or give an object lesson. Children must be able to identify the following :—

Bamboo, Sugar-cane, Coffee, Orange, Banana, Tobacco, Mango, Yam, Ginger, Pine-apple, Bread-fruit, Sweet-potato. Animals as in Standard I. Blackie's *Tropical Reader.* Part I, Book I. This is more for guidance of the Teacher, than as indicating what the children should read.

STANDARD III.—*Plant Life.*

Parts of Plant as in Standard II but more fully.
3 Typical Flowering plants—Sugar-cane, Mahogany, Lime.
3 Flowerless plants—a Fern, a Sea-weed, a Moss.
3 Climbing plants—Creeping pink,* Bonavist, Water-lemon.
3 Tuberous root plants—Sweet-Potato, Cassava, Radish.
Blackie's *Tropical Reader*, Part II, Book I for Teacher's guidance.
Blackie's *Tropical Reader*, Part II, Book I pages 68—108 for children.

STANDARD IV.

(1) Animal Life (see Reader) General knowledge.
Part I, Book II. Blackie's *Tropical Reader*, pages 1 to 51.

In all standards children should be encouraged to cultivate plants in boxes and pots. In order to obtain the grant for teaching of Agriculture, growing specimens must be shown.

STANDARD V.

Lessons on the following to be given :—
Sugar, Coffee, Banana, Cocoa, Tobacco, Yams, Corn, Food of Plants, Germination, Tillage and Drainage. The names and uses of tools used in cultivation. Experiments in digging, hoeing, raking and planting. Blackie's *Tropical Reader*, Part II, Book II.

STANDARDS VI. & VII.—*Cultivation of Crops.—Health.*

Questions from pages 109 to end including Sweet Potatos, Yams and Eddoes—Blackie's *Tropical Reader*, Part III, Book II.

Opportunities for showing growing plants, for practical gardening, use of tools, garden plots cultivated by children &c., &c., should be given whenever possible.

The portions named for the *Tropical Readers* are intended for the guidance of teachers rather than as portions to be learnt by scholars. In the higher standards the children will be expected to have made themselves thoroughly acquainted with the subject matter of the portions indicated.

(* *Ipomea Quamoclit*, ED. *A. N.*)

SCIENCE NOTES.

Pine-apple as an aid to Digestion.

On page 43 of the *Agricultural News* we drew attention to the fact that the pine-apple contained a ferment, called 'bromelin,' almost identical in its action with papain, the ferment contained in the papaw. The value of the papaw as an aid to digestion has long been known, whilst that of the pine-apple has only recently been recognized. The *Lancet* has taken up the question and says 'the partaking of a slice of pine-apple after a meal is quite in accordance with physiological indications.' Bromelin exerts a powerful action on proteids, digesting '1,000 times its own weight within a few hours.' Fibrin disappears entirely, the white of eggs is digested slowly, whilst albumin of meat is transformed first to a pulpy gelantinous mass, to be completely dissolved later. Cooking destroys the activity of the ferment, but the *Lancet* is of opinion that 'unless the pine-apple is preserved by heat, there is no reason why the tinned fruit should not retain its digestive power.' Unfortunately, however, for this hope pine-apples are sterilized by steam-heat during the process of canning, the ferment being almost certainly destroyed. 'Unlike pepsin, the digestive principle of the pine-apple will operate in an acid, neutral, or even alkaline medium, according to the kind of proteid to which it is presented. It may therefore be assumed that the pine-apple enzyme would not only aid the work of digestion in the stomach but would continne that action in the intestinal tract. Pine-apple, it may be added, contains much indigestible matter of the nature of woody fibre, but it is quite possible that the decidedly digestive properties of the juice compensate for this fact.'

Cockroach Poison.

Cockroaches can be destroyed by mixing equal parts of molasses, or sweet chocolate, and boracic acid, and spreading this on small pieces of tin or cardboard, which are placed in cupboards or under furniture. The mixture is not poisonous to dogs and other domestic animals, but will destroy the cockroaches.

Molasses as a Food for Army Horses.

Attention has already been directed in this Journal to the value of molasses as a food for horses and cattle (pp. 22 and 66.). The following important paper by Mr. E. F. Griffin, Veterinary Artillery Corps, Fort Sheridan, Illinois, U.S.A., appeared, under the above title, in the *Louisiana Planter* for April 26, last. This account is well worth the careful attention of all owners of horses and cattle in the West Indies:—

While serving with the Fifth cavalry in Porto Rico, 1899 to 1901, it was observed that the natives used considerable molasses in the feeding of their ponies. On inquiring into the reasons we were informed that the corn of the country was small, hard, scarce and expensive; oats had to be imported; hay was an unknown quantity, it being practically impossible to cure grass in a country where the rainfall was so great and frequent; besides, as vegetation flourishes the year through, grass in large quantities was always obtainable, although of a coarse variety and containing 85 per cent. of water.

USE BY NATIVES IN PORTO RICO

Grass as fed, is cut early in the morning, made into bundles from 10 to 15 lb., transported on oxcarts to the neighbouring towns, and there retailed for a small sum to the horse owners. An unlimited supply of this grass is allowed to the horse, it, however, being cut or chopped into short lengths first. In addition to this, where molasses is obtainable (and it is very plentiful in this sugar-raising country), and cheap enough, it is added to the drinking water and the animal is allowed to partake of it in large quantities. All of the ponies do good work on this ration and endure surprisingly the hard usage and brutal abuse to which they are subject by the native Porto Rican and the Spaniard, who are seemingly devoid of mercy where horse flesh is concerned. The question suggests itself,—why not feed army animals in this manner?

Through the kindness of Colonel Clem, chief quartermaster of the then Department of Porto Rico, a money allowance of $80 was placed at our disposal for the purchase of molasses for the purposes of experiment.

EIGHT HORSES EXPERIMENTED ON.

Six troop horses and two private horses were selected for the feeding experiment, which was inaugurated January 1, 1899, and continued until May 31 of the same year. In carrying out the experiment I was ably assisted by a detail of enlisted men, in charge of Farrier Pagoda, of Troop L., Fifth cavalry.

On the appointed day the eight horses were weighed, pulse, temperature, respirations, secretions, etc., noted and recorded; also the condition of the teeth and general health, all of which were normal; selection of horses was made without discrimination except that of the two private horses, one of which belonged to the adjutant of the regiment, the other to ourselves.

RATIONS.

Commencing with the morning feed on January 1, the oats ration was gradually decreased and grass substituted, at the rate of 3lb. of grass for one of oats. Commencing on the 4th, the hay ration was gradually diminished and its place supplied with grass at the rate of 2lb. of grass for one of hay. On the 6th, in addition to the grass, now amounting to 21lb. a day (chopped), there was added, mixed therewith, 3lb. of molasses. The hay and oats were partaken of eagerly, also the fresh grass, but that mixed with the molasses was absoutely refused, except by horse No. 2, which was very fond of candy or sugar. He, however, appeared to have trouble in its mastication, when it struck us that the molasses was not sufficiently diluted. At the next feed 25 per cent. of water was added to the molasses, when five of the animals commenced to eat it gingerly. By the 10th. of the month all of the horses were eating 35lb. of grass and 14lb. of molasses daily without the addition of any other feed whatsoever.

TEMPORARY LOSS IN WEIGHT.

From the 7th. to the 18th. each horse lost in weight from 25lb. in the case of No. 2 to 32lb. in the case of No. 5. Contrary to expectations, there was no relaxation of the bowels noticed: in fact, at a late period bran had to be given to overcome a partially constipated condition in all of the subjects; urine was clear and secreted in greater quantity than usual, but on test for sugar no reaction could be observed.

During this time each animal was doing the usual routine work of the garrison—drills, parades, scouts, horse exercise and patrols, amounting in all to about five or six miles a day.

On the morning of the 17th. it was decided to give the animals a regular amount of work, consisting of twelve miles a day each, with saddle packed with soldier's field kit, or its equivalent, which with the man, averaged 203 lb.

Animals were watered at 6 a.m., fed 15lb. of grass and 7lb. of molasses immediately afterwards; at 7:30 a.m. they were all saddled, and the detachment, under our direction (riding No. 2), proceeded thus: One mile walk, one mile regulation trot, one mile walk, one mile slow gallop, two mile walk, one mile fast gallop, one mile trot, two mile walk. Returning to the stable not earlier than 9:30 a.m., unsaddled, placed horses on picket line; water was offered at all the numerous streams crossing the line of march while en route, but was refused except on rare occasions, and then partaken of only by the oldest animal in the detachment, No. 6, fifteen years old; water was offered at noon, but little partaken of; at 4:30 p.m. 20lb. of grass and 7lb. of molasses were again fed, salt was offered twice a week, and about three ounces partaken of for the week; the molasses was diluted with 25 per cent. of water and mixed with the chopped grass as far as possible; where all could not be mixed it was dissolved in water and offered as a drink, which was partaken of during the night out of the bucket left in each manger.

THE HORSES INCREASE IN WEIGHT.

Commencing with January 20, all the horses commenced to pick up, and by February 5, all of them had arrived at their original weight, and in some cases, notably No. 2, had surpassed it, with the exception of No. 6, the old horse, which regained his weight slowly. By the end of February all the horses had increased in weight over the original from 35 to 68 lb., the former in the case of No. 6, the latter No 2. This increase was maintained or varied from very little throughout the experiment, except in the case of No. 6, the old horse, which slowly put on 52lb. over the original. The work was continued daily, rain or shine, Sundays excepted, and in addition to this we were glad to let the horses out to garrison riding parties for drills and parades so long as it did not interfere with the regular work, with the understanding, however, that no food should be offered while absent from the stable. In addition to this all the horses were given a swim in the sea every Sunday afternoon for about half an hour with the object in view of washing off any molasses sticking to the coat. Grooming was only indulged in once a day, and that about 4 in the evening.

(To be continued.)

ST. VINCENT: ANNUAL REPORTS ON THE BOTANIC STATION, AGRICULTURAL SCHOOL AND LAND SETTLEMENT SCHEME, 1901.

Botanic Station: The report deals, in detail, with the routine work of the Station. The mole-cricket seems to have done considerable damage to the lawns and some of the provision crops such as onions and English potatos. The most successful remedy for this pest was the application of common soap suds. Budded oranges were introduced from Jamaica. Economic and other plants, principally cacao, limes and coffee, to the number of 25,000 were distributed during the year; including 9,000 supplied gratis to settlers on Crown Lands and to Public Institutions in the island. The experiment plot at Georgetown proved satisfactory but those on the Soufriere and Mount St. Andrew were abandoned.

Bee-keeping occupied considerable attention. The Christmas wreath *(Ipomea sidaefolia)*, a useful bee plant, was established and seeds were distributed to bee-keepers. The rainfall during the year was 125 inches being twelve inches above the average for the last twelve years. Two Poland China boars, two Southdown rams and three lop eared ram goats were introduced during the year by the Imperial Department of Agriculture for the purpose of improving the local breeds of stock. The expenditure for the year was £675. The amount received from the sale of plants and produce was £52.

Agricultural School: The report deals with the work of the new agricultural school founded in 1901 and maintained by the Imperial Department of Agriculture. Twenty-four boys were in residence during the latter part of 1901. They received practical instruction in Agriculture and Horticulture every morning except Sundays for three and a half hours. Most of the provisions used at the school were raised by the boys themselves. Four hours a day were devoted to indoor work the instruction comprising reading, composition, arithmetic, geography and the elements of agricultural science. About a quarter of an acre of the grounds is devoted to boys' gardens in the cultivation of which, during their spare time, the students take great interest. The expenditure during the year was £622.

Land Settlement Scheme. The progress during the year was satisfactory. Upwards of 7,000 economic plants, chiefly cacao and coffee, were planted. Numerous drains and ten and a half miles of windbreaks were established, the trees employed being Galba *(Calophyllum Calaba)* and Angelin *(Andira inermis)*. In connexion with this scheme an experienced local planter has lately been appointed Agricultural Instructor.

DEPARTMENT NEWS.

The third and concluding course of lectures to Teachers of Elementary schools at Grenada is proposed to be given at St. George's from Wednesday, August 6, to Thursday, August 14, next. The theoretical lectures will take place in the morning and the practical demonstrations at the Botanic Gardens in the afternoon of each day. The examination will be held on Thursday August 14.

The half-yearly examinations of the resident pupils at the Agricultural Schools at St. Vincent, St. Lucia and Dominica were held at the close of last month. The results will shortly be published.

AGRICULTURAL NOTES.

St. Lucia.

Mr. G. S. Hudson contributes the following notes:—

Weather. The weather continues extremely wet. Up to June 18, there was not a single day that could by any courtesy be called 'fine.' The rainfall to the same date was about 11 inches.

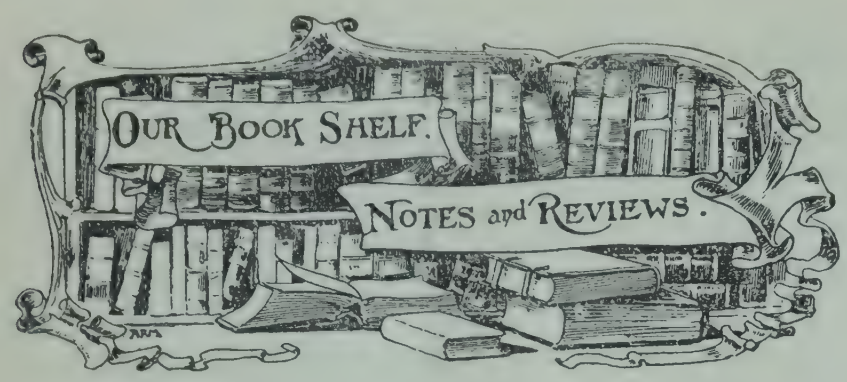
Cacao Crop. This continuously wet weather cannot fail to have a prejudicial effect on the coming crop, occurring as it does during the principal flowering season. With the atmosphere almost continually at saturation point, it is extremely difficult for fertilization to take place. After bad weather the ground is found strewn with unfertilized cacao flowers which planters often attribute to wind, but if one would try to blow off a *newly opened* cacao flower with a pair of bellows, he would probably fail. If a flower remains unfertilized after the time for fertilization has passed, changes take place in the stalk and then the flower will fall with the slightest touch.

Arrowroot. The St. Vincent disaster has sent up the price of arrowroot to 4*d.* and 6*d.* per lb., and as the major part of the 1902 crop must have been dug, cured and shipped before the eruptions, there is a possibility of these high prices being maintained for a couple of years. But West Indian planters do not move easily into a new groove. There is still time to plant and every prospect of a good profit, the cost of production being usually not more than 2 cents per pound.

Ginger. Prices for the last three years have been practically profitless, but now show some signs of mending. A certain class of Jamaica peasants have been accustomed to plant ginger, and their fathers before them, and they will plant ginger no matter what the market conditions may be.

Sweet Potato. The same thing occurs in regard to this product. It is the rule to plant potatos as soon as the rains come, and every one does so; consequently potatos are practically given away in October, November, and December. Dry lands could carry their crops as late as March, and humid forest estates almost all the year through.

An Experiment with Swedes in Ceylon. At the Hakgala Botanic Gardens (about 6,000 feet elevation) in Ceylon, an interesting experiment on the growth of Swedes has just been made. An ounce of seed was sown on July 25 on a piece of land 48 yards square. The crop was taken up on December 9,—4½ months from the time of sowing—the yield being 280 lb. or at the rate of 12½ tons to the acre. The largest weighed 8 lb. and measured 24 inches in circumference. These roots possess good feeding qualities for cattle and sheep.



THE CYCLOPÆDIA OF AMERICAN HORTICULTURE. Edited by L. H. Bailey, *Macmillan & Co., London and New York. 4 vols.*

The fourth and concluding volume of this important work has just been issued, the first volume having appeared in 1900. Its aim is to make a complete record of the condition of horticulture in North America at the beginning of the twentieth century. The work discusses the cultivation of fruits, flowers and garden vegetables, describes all the species which are known to be in the horticultural trade, outlines the horticultural possibilities of the various states, territories and provinces including Porto Rico and the Phillipines, and indicates the leading monographic works relating to the various subjects.

In carrying out this scheme the editor has availed himself of the assistance of some four hundred and fifty contributors —specialists in the subjects on which they have written,— among whom are many of the leading American botanists and agricultural experts. Particular attention has been devoted to tropical and sub-tropical economic plants, a fact which greatly enhances the value of the work from a West Indian point of view. Among the contributors are Messrs. Fawcett and Harris of Jamaica, and Mr. J. H. Hart of Trinidad.

The classification adopted is that of Bentham and Hooker in their *Genera Plantarum*, and the standard of nomenclature that of the *Index Kewensis*—facts which render these volumes more useful to English workers than if the system of Engler and Prantl had been used.

Many of the special articles are admirably illustrated and contain much valuable information of use in the West Indies. Special mention may be made of those on pruning, seedage (the propagation of plants from seeds and spores), cuttage (growth from cuttings), pine-apples, citrus plants, spraying, transplanting, insects, and horticulture.

A valuable feature of the work consists in the references to the standard works in each subject on both the practical and the scientific side. By this means anyone wishing to make a detailed study of any particular plant or subject is at once placed on the right track to obtain the really useful literature of the subject—a boon of the utmost value to the worker at a distance from a good scientific library.

Although much of the information in these volumes is not of *direct* application in the West Indies, nevertheless the work, as a whole, is well worthy of close study by all interested in tropical agriculture and horticulture, mainly on account of the suggestive character of many of the articles. In its pages some idea of the great strides which have been made in American horticulture can be gathered, as well as of the methods by which this progress has been achieved. As a general up-to-date work of reference on horticultural subjects, these volumes are bound to prove of great value to all interested in the raising of economic plants, whether in the tropics or in temperate regions. To the various Agricultural Societies, Natural History clubs, and libraries in the West Indies, we heartily recommend the work.

AGRICULTURAL INSTITUTIONS IN THE WEST INDIES.

Jamaica Board of Agriculture: *Chairman*: The Hon'ble Sydney Olivier, C.M.G.; *Secretary*: W. R. Buttenshaw, M. A., B.Sc.; *Publication*—Occasional Bulletin.

Jamaica Agricultural Society (with thirty two affiliated Branches). Kingston, Jamaica. *President*: Sir Augustus W.L. Hemming, G.C.M.G. *Deputy Chairman*: Hon'ble Wm. Fawcett, B.Sc., F.L.S. *Secretary*: John Barclay. *Publication*: "Journal of the Jamaica Agricultural Society."

Royal Jamaica Society of Agriculture & Commerce & Merchants' Exchange, Kingston, Jamaica. *President*: Hon'ble Lieut-Colonel Ward, C.M.G. *Secretary*: J. L. Ashenheim. *Publication*: Annual Report.

The Institute of Jamaica: Kingston, Jamaica. *Chairman*: Sir Fielding Clarke. *Secretary*: Frank Cundall, F.S.A., *Curator of Museum*: E.S. Panton *Publications* "Journal of the Institute of Jamaica." "Jamaica in 1901."

Kingston & St. Andrew Horticultural Society. Kingston, Jamaica. *President*: Hon'ble Wm. Fawcett, B.Sc. *Secretary*: William Harris, F.L.S.

British Guiana Board of Agriculture, Georgetown, Demerara. *Chairman*: Hon'ble A.M. Ashmore, C.M.G. *Deputy Chairman*: J. B. Harrison, M.A., C.M.G., ; *Secretary*: Oscar Weber: *Agricultural Instructor*: R. Ward: *Assistant Instructor in Agriculture*: J. E. Beckett (on probation); *Veterinary Surgeon*: J. A. Raleigh.

British Guiana Royal Agricultural & Commercial Society Georgetown, Demerara. *President*: Luke M. Hill, B.A., M.I.C.E. *Secretary*: Thomas Daley. *Local Secretary*: (Berbice,) Dr. C. F. Castor. *Assistant Secretary and Librarian*: J. Rodway, F.L.S.. *Curator of Museum*: Richard Evans, M.A., B.Sc., *Publication*: "Journal of the Royal Agriculture and Commercial Society of British Guiana."

Trinidad Agricultural Society, Port-of-Spain, Trinidad. *President*: Sir Alfred Moloney, K.C.M.G. *Secretary*: Edgar Tripp. *Publication*: "Proceedings of the Agricultural Society of Trinidad."

Grenada Agricultural Society, St George's, Grenada. *President*: Sir Robert B. Llewelyn, K.C.M.G. *Secretary*: W. E. Broadway. *Publication*: Minutes of Meetings.

Barbados General Agricultural Society & Reid School of Practical Chemistry, Bridgetown, Barbados. *President*: Sir. George C. Pile, Kt. *Secretary*: J. H. Poyer. *Publication*: "Barbados Agricultural Gazette and Planters' Journal."

St. Lucia Agricultural Society, Castries, St. Lucia: *President*:————*Secretary*: R. G. McHugh.

Dominica Agricultural Society, Roseau, Dominica. *President*: The Hon'ble H. Hesketh Bell. *Secretary*: A. K. Agar.

Antigua Agricultural Society. *President*————*Secretary*: W. N. Sands.

St. Kitts-Nevis Agricultural Society. *President*: Honourable E. G. Todd. *Secretary*: C. A Smith.

[Further particulars of Agricultural and Horticultural Institutions in the West Indies would be gladly received for this list. Also fixtures for Agricultural Shows for 1902.]

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is desirable that inquiry be made, beforehand, as to the terms on which such produce will be received, and whether the market is favourable or not.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—June 24, 1902.—Messrs. J. Hales Caird & Co., Messrs. Gillespie Bros. & Co. and The Public Ledger, June 7, 1902.

Aloes—Barbados 13/- to 35/ ; Socotrine 70/- to 80/- per cwt.
Arrowroot—St. Vincent, fair 4*d* per lb.
Balata—Demerara sheet 2/4 per lb.
Bees-wax—Jamaica, fair palish £7 17*s* 6*d* to £8 per cwt.
Cacao—Trinidad, dark defective 58/- to 62/- ; good to fine red 64/- to 70/- per cwt.
Grenada, ordinary to fair 56/- to 62/- ; good to fine 61/- to 65/- per cwt.
Jamaica, fair ordinary 54/- to 56/- ; fine fermented 61/- to 62/6 per cwt.
Dominica, fair 56/6 to 59/- ; fermented 59/6 per cwt.
Cardamoms—1/10 to 2/3 per lb.
Cassia Fistula—5/6 to 35/- per cwt.
Castor Oil—4½*d* to 4¾*d* per lb.
Coffee—Jamaica, fine ordinary 43/- to 45/; good bold 66/- to 75/ ; fine bold 98/- per cwt.
Costa Rica, 42/- to 88/6 per cwt.
Peaberry, 68/6 to 81/6 per cwt.
Cotton—Carriacou, 4¾*d*. per lb.
Cowage—1*d* to 2*d* per lb
Fustic—Jamaica, quiet.
Ginger—Jamaica, good bright 48/- to 57/- ; common 34/- to 35/- per cwt.
Honey—Jamaica, bright pale amber 18/- to 19/6 ; dark red 14/- to 14/6 per cwt.
Jalap—4*d* to 6*d* per lb.
Khus-Khus Root—12/- per cwt.
Kola Nuts—1*d* to 4*d* per lb.
Lime Juice—Raw, 1/2 to 1/5 per gallon ; concentrated, £12. per pipe.
Logwood—Jamaica £4 5*s* to £4 15*s* per ton.
Mace—no quotations.
Nitrate of Soda—Refined £9 15*s* ; ordinary £9. 2 6*d* per ton.
Nutmegs—No quotations.
Oil of Limes—Distilled 1/11 to 2 - per lb. ; hand pressed none offering.
Pimento—2⅝*d*. to 2½*d* per lb.
Sarsaparilla—Jamaica, fair 1/3 to 1/4 per lb.
Sugar—Muscovado 10/- to 14/- ; crystallized 12/10½ to 15/- per cwt.
Sulphate of Ammonia—Grey, 24 per cent., London £13 per ton.
Tamarinds—Barbados 12/- to 13/- per cwt.
Tonquin Beans—9*d* to 2/9 per lb.
Fruit—Covent Garden Market (Gardener's Chronicle, June 14, 1902.)
Bananas—7/- to 10/- per bunch.
Lemons—8/- to 14/- per case.
Mangos 6/- to 12/- per dozen.
Oranges—16/- to 20/- per case.
Pines—3/- to 4/- each.

New York,—June 13, 1902.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaica, 9 hands $1.30, 8 hands 95c.. 7 hands 60c. to 65c. per bunch.
Cacao—African 12¾c. to 13c. ; Caracas, fair to good ordinary 14c. to 14½c. ; Jamaica, good fermented 11¾c. ; Grenada 13¼c. Trinidad 13c. to 14c. per lb.
Cocoa-nuts—Jamaicas, $20.00 per M. ; Small Trinidads $12.00 per M.
Coffee—Rio, good ordinary 5¼c. ; Jamaica ordinary 6c. ; good ordinary 7c per lb.
Ginger—8c. to 8½c per lb.
Pimento—5¼c. to 5½c. per lb.
Rubber—Nicaragua Scrap 51c. per lb ; sheet 46c. per lb. ; Guayaquil Strip 48c. per lb.
Sugar—Muscovado, 89°, 2⅞c. to 3c. ; centrifugals, 96°, 3 7/16c per lb.

INTER-COLONIAL MARKETS.

Antigua,—July 2, 1902.—Messrs. G. W. Bennett, Bryson & Co., Ltd.

Molasses—8c. per gallon, package included.
Sugar—Muscovado $1.00 per 100lb., nominal.

Barbados,—July 5, 1902.—Messrs. T.S. Garraway & Co.

Arrowroot—good quality, $3.50 per cwt.
Cacao—$13.50 per cwt.
Coffee—Jamaica and ordinary Rio $9.00 and $9.50, respectively.
Eschalottes—12c. to 14c per lb.
Hay—lotting 90c. per 100lb.
Manures—Nitrate of Soda $60.00 per ton. Sulphate of Ammonia—$75.00 per ton.
Molasses—8c. per gallon and $4.00 for package.
Onions—Bermuda $1.80 per 100lb. ; stringed at $2.14 per 100 lb.
Potatos—$3.00 per barrel.
Rice—Ballam $4.90 per bag ; Patna $3.75 per bag.
Sugar—in hogsheads, 85c. per 100lb. and $5.00 for hogshead ; in bags $1.05 per 100lb.

British Guiana,—July 3, 1902.—Messrs. Weiting & Richter.

Arrowroot—$8.50 per barrel.
Cacao—native 11c. to 12c. nominal.
Cassava Starch—$6.50 per barrel.
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica 12c. to 13c. per lb. (retail.) Creole, 11c. to 12c. per lb.
Eddoes—$1.20 per 100lb.
Onions—sold out at 4c. per lb.
Pea Nuts—American 4½c. to 5c. (retail.)
Plantains—20c. to 40c. per bunch.
Potatos English—$4.00 per barrel.
Rice—Ballam $4.80, Patna $5.80 per bag.
—Creole Rice 20c. per gallon, (retail.)
Sweet Potatos—Barbados 5/- per 100lb.
Tannias—$1.20 per 100lb.
Yams—10/- to 12/6- per 100lb.
Molasses—12/6 Vacuum Pan yellow 14½c. to 16c. per gallon, casks included.
Sugar—Dark Crystals $1.60 ; yellow $2.00 to $2.10 per cwt.
Timber—Greenheart 32c. to 40c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—June 18, 1902.—Messrs. Gordon Grant & Co. and Messrs. Edgar Tripp & Co.

Cacao—Ordinary to good red $13.35 to $13.60 ; fine fermented estates $13.75 to $14.00 per cwt.
Balata—38c. to 39c. per lb.
Coffee—No quotations.
Onions—$2.00 per 100lb. Scarce
Potatos English—$2.00 per 100lb. Market bare.
Rice—Yellow $4.70 ; White Table $5.90 per bag.
Sugar—For Grocery use, $1.70 to $3.00 per 100lb.
Molasses—No quotation.

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AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. I. No. 8. BARBADOS, AUGUST 2, 1902. PRICE 1*d*.

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Prospects in Jamaica.

IN *The Times* of June 28, there is an important article entitled 'Jamaica Revisited' which deserves more than a passing notice. Jamaica is an interesting and picturesque island. It is one of the oldest as well as one of the largest of the British possessions in this part of the world, and its fortunes are typical of what has happened, and is happening, in most of these Colonies.

The economic condition of the island within the last fifty years has depended almost entirely on the exports of the following commodities viz., sugar, and rum, coffee and dye-woods. The sugar and rum exports have unfortunately been steadily declining both in quantity and value since emancipation; the coffee industry has suffered recurring periods of great depression due to drought and low prices; while the dye-wood industry, principally logwood, has been so seriously crippled, by falling off in demand, that its value has fallen to almost one-third of its former dimensions. Latterly the island has passed through an acute crisis of a three-fold character—economical, financial and political. The first was due to a singular concourse of circumstances whereby all the staple industries were depressed at one time. The financial situation already acute was rendered more difficult by the burden of an 'ill constructed, badly financed and unremunerative railway.' The political crisis we need not discuss. According to *The Times* 'never very serious at any time—it is now less severe than ever.'

The question of the moment is: How does Jamaica stand financially and economically; and what are its prospects as compared with a few years ago? According to the correspondent of *The Times* 'there is manifest progress in several directions and in almost every direction a fair prospect of further improvement. Many economies have been instituted

retrenchment has been rigidly enforced—rather rigidly than wisely in some directions perhaps—and though the financial prospect is not over-bright, yet the extreme tension of three years ago has been relieved.' Of the economic crisis *The Times* continues 'it is possible to speak in much more positive and hopeful terms. First and foremost in importance, though latest in point of time, has been the happy conclusion of the Brussels Conference which seems to point to the final disappearance of the European Bounties on beet sugar in September 1903.' Jamaica will probably now enter upon a new era of sugar production and it is confidently hoped that 'many cane fields now desolate will once more smile with the verdure of the sugar-cane, many a modern factory, equipped with all the best appliances for making sugar on the most favourable terms, will in time take the place of the deserted and now antiquated factories to be found in all parts of the island.'

Since 1899 the fruit industry has been extended and improved by the establishment of the Direct service with England. The exports of fruit are now of the annual value of three-quarters of a million sterling. But, according to *The Times* correspondent, one of the greatest changes wrought at Jamaica is 'the very large and sudden development of the tourist traffic. Jamaica has never known such a tourist season as that of last winter. It is probably the precursor of many such seasons to come. It is a moderate estimate that this abundant and unprecedented influx of tourists has involved the expenditure of £35,000 in the island . . . . and it is obvious that a great portion of this sum must filter down through all classes of the community.'

We may conclude that although much remains to be done to restore the financial equilibrium and to build up large and successful industries in the island the outlook is distinctly brighter than it was, and we may hope that as one of the most accessible and attractive of tropical lands Jamaica may soon regain its former prosperity.

Rubber Forests in the Soudan.

The following extract from *The Board of Trade Journal* of April 24, 1902, is of interest to rubber planters in the West Indies:—

Lord Cromer, in his recent report to the Foreign Office, states that considerable quantities of rubber trees are reported in many of the districts of the province of the Bahr-el-Ghazal. The Director of Woods and Forests has been despatched to report on the possibilities of re-opening the india rubber trade of the Bahr-el-Ghazal, which, in former days, was one of the principal sources of revenue of that district.

SUGAR INDUSTRY.

Experiments with Varieties of Sugar-Cane at Jamaica.

Mr. H. H. Cousins, Island and Agricultural Chemist of Jamaica, contributes the following report:—

The experiments on cane varieties at the Hope Gardens have just been completed. One hundred and two varieties were tested.

B. 254 came out first with 11,831 lb of sucrose per acre. B. 379 was second with Otaheite and Poaole third and fourth, respectively.

D. 95 gave the richest juice, 1·0896, and the highest sucrose, 2·3 lb per gallon.

D. 142 the poorest juice, 1·0557, and the lowest sucrose content, 0·998 lb per gallon. Some varieties gave a high quotient of purity approximating 95 per cent.

B. 147 was eighth. It gave a high quotient of purity and a low glucose ratio. This cane should do well on some soils in Jamaica.

D. 95 is deficient in yield at Hope. It ratooned at Albion this year at $2\frac{1}{2}$ tons crystals per acre as against 4 tons as plants.

It may be mentioned that the Hope Gardens are situated in the rather dry plains of Liguanea about six miles from Kingston, at an elevation of 650 feet above the sea. The average rainfall is 46·4 inches, the mean annual temperature 77° F.

Stunted and Rotten Canes.

A correspondent writes: I have read a report which appeared in the *Barbados Advocate* (of July 21) from the Parish of St. John's, that in the crop just over 'the canes seemed stunted and hard and the juice so weak that it would scarcely granulate in the coolers; then there was the large amount of rotton canes to be seen everywhere.' In these days of low prices and short crops it is really remarkable that the planters in St. John's, at all events, should allow themselves to lose so large a share of their canes owing to circumstances entirely within their own control. The stunted, hard canes were, no doubt, badly affected by the root-disease, and this is usually due to want of care in selecting tops, or to error in planting, leaving the tops to be attacked by fungus as suggested by Mr. Howard at the late Conference. As to rotten canes, they are, I expect, largely, if not entirely, due to the presence of the moth-borer, which could be prevented with a little care as effectually as any other trouble of the sugar-cane. As a planter of many years' experience I can truly say that on plantations where 'stunted

and hard canes' appear in any quantity, and a 'large amount of rotten canes are to be seen everywhere,' no excuse can be made when the remedies are at hand and when, with a little care, the loss could be reduced to a minimum. I would suggest that a short note on the subject may appear in the *Agricultural News* pointing out that if we are to maintain a successful sugar industry in this island we must take more care of the canes and prevent the enormous loss referred to as having recently taken place in the Parish of St. John's.

How New Pests are Introduced.

In a recent circular issued by the Hawaiian Sugar Planters' Association an interesting example is given of the manner in which new pests may be introduced into an island. At present the Hawaiian Islands are singularly free from many of the more destructive insect and other pests which bring about so much damage in other parts of the world where the sugar-cane is cultivated. In particular, the various destructive 'moth-borers' of the West Indies and Java do not at present occur in the Sandwich Islands. In order to prevent the introduction of new pests into these islands, the Director of the Sugar Experiment Station, Dr. C.F. Eckhart, has drawn attention to the advisability of obtaining all new varieties of cane for trial from other parts of the world through the Experiment Station only. In this way all shipments can be examined by a competent expert and dangerous samples destroyed immediately. That this precaution is necessary is evident, he states, from the condition in which a sample of seedling canes from Demerara arrived at the Hawaiian Station. The canes were sent in a ventilated sugar barrel and arrived at Honolulu in eighty-five days. On examination it was found that the cuttings were almost completely destroyed by borers, but fortunately, all these had in turn been destroyed by ants and parasitic fungi with the exception of one beetle which arrived alive. The barrel and its contents were immediately burned. This example is sufficient to show the great danger of introducing plants or cuttings from other parts of the world unless due precautions are taken to prevent the introduction of harmful pests at the same time. The safest way would undoubtedly be to limit plant introduction as far as possible to Experiment Stations and Botanic Gardens where all due care could be taken.

Porto Rico.

PROSPECTS OF SUGAR CROP, 1902.

It is judged that the fine sugar crop of last year, 1900-1, 80,000 tons, said to be the largest ever exported from the island, will be exceeded this season, 1901-2, by some 15,000 tons.

Its shipment under free trade is a matter of great gain to the planters, as it enables many of the smaller planters to undertake improvements before impossible, while the fair prospect for the future has induced the creation of various new sugar enterprises and land investments for further planting. This would seem, however, as far as individual planters are concerned, a useless operation ; for there is but little doubt that in a short time the entire sugar industry will be absorbed openly (as it is virtually now, though unavowedly) in the great mainland trust. The trust, in the beginning of the autumn, voted an increase of capital stock for the acquirement of land in Cuba and Porto Rico, and the political conditions of the former not being at present at all favourable for such ventures, it is possible that the entire sum ($13,000,000 United States) may be utilized in Porto Rico. Several important sugar works were taken in hand during the year, the principal being a $1,000,000 Central at Guanica, owned by a new company controlled from New York. It will have a grinding capacity of 1,600 tons of cane per day. Its crystallizers and filters come from Germany and all the other machinery from the United States. (Diplomatic and Consular Report, No. 2,826. *Trade of Porto Rico* for 1901).

Forked Sugar-Canes.

Occasionally sugar-canes showing a marked departure from the normal form and habit are met with. The occurrence of bud variation in sugar-cane was described (with coloured plates) in the *West Indian Bulletin*, Vol. II., pp. 216-223. More recently specimens of forked canes have been kindly communicated to this Department. In these the usual single stem is divided into two stems both of equal size and appearance. They are identical, also, in colour and markings. A sketch is given below of a forked cane (White Transparent) presented to the Department by Mr. W. H. Smith of Drax Hall, Barbados.

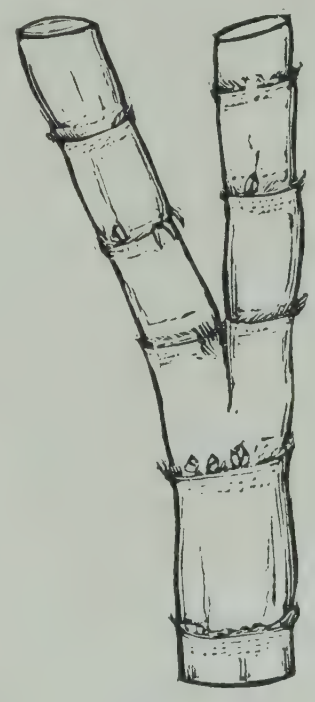


Fig. 11. FORKED SUGAR-CANE.

It will be observed that this forking of the stem is quite distinct from the branching due to the development of side buds. The latter is a common occurrence when the top of a cane is injured, or there is an abnormal growth of buds in 'stand over' canes. This is well illustrated in the plate facing p. 219 of the *Bulletin* above referred to. Forked canes, on the other hand, are apparently the result of a division of the growing tissue at the apex of the stem. Examples have been described in Java by Benecke in a seedling cane, and by Krüger in the Cheribon variety. An excellent photograph of two forked canes, that occurred recently at Brighton and West Farm estates at St. Kitts, has been forwarded by Mr. W. Lunt, the Curator of the Botanic Station in that island. These are very similar to the specimen found at Barbados figured above. In both instances at St. Kitts, the forked specimens happened to be cane B. 147. As Mr. Lunt remarks they are 'interesting as freaks of nature but they have no economic importance.'

VANILLA.

Cultivation in the Seychelles.

(Continued from page 101.)

POLLINATION OF THE FLOWERS.

The work of flower fertilization (pollination)—for they have all to be fertilized by hand, and that on the day they open—is mostly done by women and children. The operation is a very simple one, and an average negro will acquire the knack after being shown a few examples.

[The illustration on the opposite page, reproduced from the *Kew Bulletin*, with its descriptive letter press will allow readers to follow clearly, Mr. Galbraith's description.—Ed. *A. N.*]

The flower is taken in the left hand, three fingers being placed at its back and the thumb in front, the column with organs of fertilization on top being supported against the middle sepal behind. A bit of hard wood, cut to the size of a toothpick and scraped smooth and flat at one end, is the only tool required ; this is held in the right hand. To get at the organs of fertilization easily, the sack which grows from the side of the column enveloping its front and marking the sexual organs is pressed down by the bit of wood, or this is run through its base, and the sack torn up, or the whole sack may be plucked off with finger and thumb, it matters not how it is laid open, so long as this is done quickly and without injury to any other part of the flower. The smooth end of the fecundating instrument is then laid flat on the front of the column just beneath the organs of fertilization, and being pushed up it catches under the flap which keeps the pollen from coming into contact with the stigma. The flap is raised along with the stick till it lies flat against the upper part of the column, being held in that position by the bit of wood. The stamen, at first raised along with the flap, now falls down again in its original position, and the flap being out of the way the pollen comes into contact with the stigma, and a slight pressure of the thumb on the stamen lodges the pollen in the position required ; the bit of stick being then quickly but gently withdrawn, the operation is complete.

The whole affair is very much easier done than described, and with flowers fairly numerous, an ordinary hand will fecundate a hundred or so per hour. Early morning, from 7 to 9, is the best time for fertilizing; but the work may be started with sunrise and carried on well into the afternoon, though about mid-day flowers begin to close some and the work goes slower. Most plants in full crop produce many more flowers than it is advisable to fertilize, for other parts of the vines, besides the checked hanging branches, blossom in favourable seasons and the number of pods which a vine is able to mature properly must be estimated from the plant's size and condition. In the course of four or five years, though by that time the plant cutting will be spent, if well cared for it will have grown a large quantity of vine ; and as each new shoot, when long enough, sends down aerial roots in its own behalf, it becomes, so to speak, an independent plant and the parent of others. If none of the shoots from a strong growing vine have been removed the mass of growth in time becomes enormous, and may be equal to maturing a hundred or more good pods. When the supporting tree is stout and furnishes forks enough to admit of the vine being spread out so as to let plenty of air through it the vine may be allowed to accumulate to this extent, and if it gives, say, twenty clusters, each yielding ten or more flowers, five or six might be fertilized on each.

But, generally speaking, about 30 pods to a vine is as many as should be left, and he would be a lucky planter who should average that number. In selecting flowers to fertilize those should be chosen which spring from the lower part and from the sides of the flower stalks, from which position they grow straighter pods than those coming out on top. In favourable weather, i.e. moist but not heavy rain (which latter often washes the pollen grains away before they germinate), only a small percentage of flowers will fail of fecundation. In case of failure, the flower drops off in three days or less, but otherwise remains attached to its stalk and slowly withers ; the *gynostemium* adheres to most pods till they begin to ripen ; thus it is easy to see the number successfully fecundated in each bunch, and where enough are secured the rest can be broken off. Later it is advisable to cut clean off with a knife the flower stalk a quarter of an inch or so beyond the last fertilized flower. Some planters plaster a bit of sticky clay on the cut surface to prevent it rotting back. Dry lime is perhaps better ; this may be dabbed on with a piece of cloth dipped in the powder.

Pods grow to their full size in five or six weeks, but take some eight months, more or less, according to the altitude at which they are grown, or the amount of shade over them, before they ripen. The indication of ripening is a slight yellowing of the whole pod, which is more marked near its free end. When under too much shade the change in colour is less noticeable, and many pods grown in such places split before they are gathered, and for that reason lose in value. To guard against splitting, and yet gather them at perfect ripeness, they should be gone

over every other day. In removing them from the flower stalks the pods are grasped one by one near their attached ends, very slightly twisted, and at the same time pressed aside with the thumb. They must be taken off quite clean. If a bit of the flower stalk comes away with a pod, as sometimes will happen, it should be cut off smoothly. Any break or crack in the pod itself, however near its butt, ranks it is as an inferior quality. Buyers are very particular in this respect. After each day's gathering, before the pods are started on their first stage of curing, it is well to sort them roughly into four classes: 1, long; 2, medium; 3, short, and 4, split.

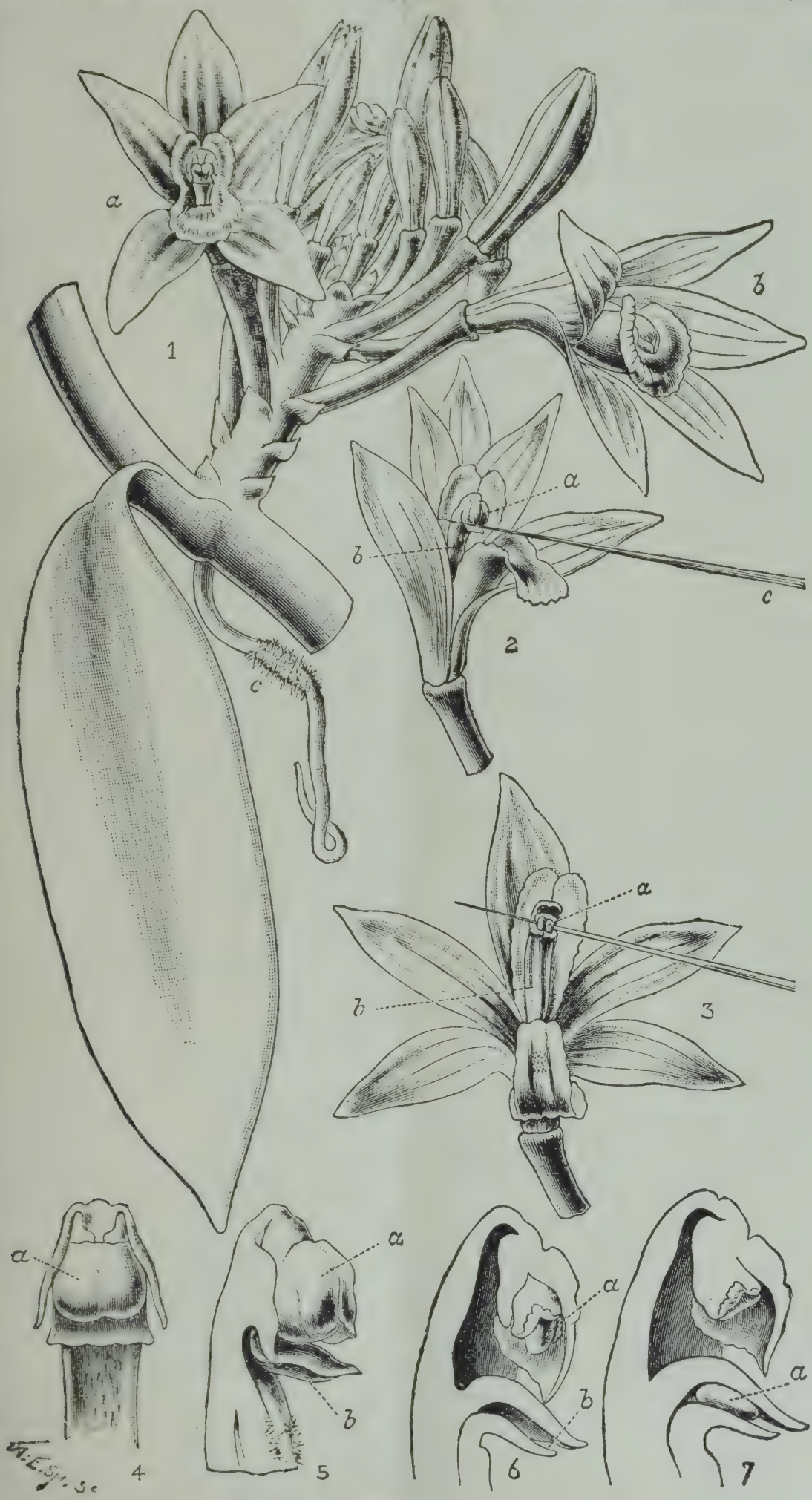


FIG. 12. FERTILIZATION OF VANILLA.
(From the *Kew Bulletin*.)

1—Portion of stem of Vanilla plant, with leaf, aerial root, and cluster of flowers; *a*, front view of Vanilla flower; *b*, side view; *c*, aerial root, with root hairs.

2—Single flower of Vanilla, exhibiting the first stage in the process of artificial fertilization. The operator, provided with a finely-pointed piece of bamboo, divides the lip or labellum medially, so that the central lobe is separated from the two side lobes. This exposes the column and organ of fecundation. The instrument is represented as placed against the column, ready to press upwards the anther *a*, and bring the pollinia in contact with the stigma *b*.

3—Single flower of Vanilla, exhibiting the second stage in the process of artificial fertilization; *b* shows position of column exposed by division of the lip [the middle lobe of lip is pulled forward and curled upon itself to show the position of the column; the side lobes of lip, separated as shown in Fig. 2, arerepresented at back of the column]; *a*, the position of pollen masses, taken from the anther and placed on the stigma.

4—Enlarged front view of top of the column; *a*, the anther.

5—Enlarged side view of top of the column; *a*, the anther; *b*, the stigma or visced surface on which the pollen masses must be placed to ensure fertilization.

6—Enlarged section through top of the column; *a*, one of the pollen masses *in situ*; *b*, the stigmatic cavity.

7—Enlarged section through top of the column; *a*, the pollen masses, having been transferred from *a*, Fig. 6, are now represented in contact with the stigmatic surface. [Although diagrammatically shown, these figures give a tolerably good idea of what is actually necessary in order to produce fertilization in a Vanilla flower.]

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the **Commissioner, Imperial Department of Agriculture, Barbados.**

It is particularly requested that no letters be addressed to any member of the staff by name. Such a course may entail delay.

Communications should always be written on one side of the paper only. It should be understood that no contributions or specimens will, in any case, be returned.

All application for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on the last page of this number.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News

Vol. I. SATURDAY, AUGUST 2, 1902. No. 8.

NOTES AND COMMENTS.

The Chinese or Dwarf Banana.

Referring to the account published in the *Agricultural News* (p. 68) of the trial shipment of bananas from Barbados, wherein it was pointed out that the fruit sent was not the usual West Indian kind (the Jamaica banana or *Gros Michel*) but the Chinese or dwarf banana, known also as the 'Cavendish' banana, largely grown in the Canary islands, and imported thence to England on a large scale, Mr. J. F. Waby, head gardener at the Botanic Gardens, British Guiana, writes :—

I am not surprised to find that the Cavendish banana carries well, for I have always noticed that this hangs long on the bunch when ripe, whereas the *Gros Michel* falls away as soon as ripe. The stature of the Cavendish is decidedly in its favour for cultivation, being less affected by the wind, and can be planted more closely together.'

Agricultural Shows, 1902-3.

The Agricultural Shows to be held under the auspices of the Imperial Department of Agriculture during the year 1902-3 are as follows:—

The Montserrat Agricultural Show was originally fixed to be held on Friday, June 27, as one of the functions in connexion with the Coronation. Whether a second show is to be held, later, has not been decided. The show at Tortola, for the Virgin Islands, is proposed to be held in October next. The Agricultural and Commercial Society of Antigua is desirous of holding an Agricultural Show at St. John's in December next. The Barbados Local Agricultural Show (as already announced) will take place at Todds' Plantation on January 13, 1903. A proposal is under consideration for holding an Agricultural Show at St. Lucia in March 1903, in connexion with the Agricultural School at Union, about three miles from Castries.

It is desirable to mention, in connexion with these Shows, that the primary object in view is to encourage the better cultivation and preparation of crops for export. No prizes provided by the Department should be awarded unless there is good competition and the exhibits show special care has been taken in curing and presenting them for exhibition. As a condition of the Grant (approved by the Secretary of State) it is required that a draft copy of the Prize List, and of the Rules and Regulations for each Show, be forwarded, beforehand, for the approval of the Commissioner of Agriculture.

Poultry Raising.

The *Agricultural News* has been described as 'exhibiting a catholic spirit and there is hardly any branch of Agriculture which does not come, at some time or other, within the scope of its view.' It is hoped to maintain this spirit and give in an interesting and helpful way hints that may eventually improve the condition of all agricultural interests in these Colonies. Amongst the small industries, conveniently within reach of everyone, there is not one so full of promise as the raising of poultry. The potential value is enormous, yet the systematic raising of poultry, outside a few poultry fanciers, is almost a lost art in the West Indies. With the view of affording simple and practical information on the subject, it is proposed to publish a series of short articles in the *Agricultural News* on poultry raising, from the pen of Mr. John Barclay, the Assistant-Secretary of the Jamaica Agricultural Society. The first of these articles appears in this number.

Grafted Mangos.

In the last number of the *Agricultural News* (p. 102) attention was directed to the extreme importance of keeping steadily in view the improvement of West Indian fruit trees by budding and grafting. The mango is possibly the most popular, and when of really good quality, the most highly esteemed of all tropical fruit. There is no difficulty in propagating the best sorts, and we trust to see the day when budded and grafted mango trees will occupy the place of the thousands of useless mango trees that now cover the land. We are led to these remarks by the receipt, from the Curator of the Botanic Garden at St. Vincent, of a delicious grafted mango known as the Peach mango. It is a large, plump fruit, weighing 10 to 12 ounces, yellow when ripe, juicy, of a delicate flavour and free from fibre. It well deserves its name of Peach mango.

Extending the Mango Season.

Sufficient attention does not appear to have been directed to efforts for extending the mango season by selecting early and late sorts and cultivating them with the special view of producing fruit earlier or later than the ordinary sorts. It is suggested that a list be prepared of early and late varieties of mangos, and when this is done it would be well in grafting them that early-fruiting sorts be grafted only on seedlings of early-fruiting sorts, and *vice versa*, instead of promiscuously, as at present. We commend the business of raising grafted mangos to some of the more enterprising of the small proprietors in the West Indies. Grafted mango plants of first-rate quality, and true to name, would readily sell for a dollar a piece.

Scientific Commission.

The members of the Royal Society Commission for the study of the phenomena associated with the recent volcanic eruptions in the West Indies after completing their visit to St. Vincent left that Island on Saturday, July 5, in the "Yare" for St. Lucia where they were received by Colonel Dalrymple Hay, the Acting-Administrator. They left the next day for Fort-de-France, Martinique. They landed at St. Piérre on Tuesday and examined the ruins and took samples of the volcanic deposits in and around the city. On Wednesday they chartered a sloop and visited the coast to the north of St. Pièrre and made observations on the slopes of Mont Pelèe. In the evening of the same day (Wednesday, July, 9) they witnessed a terrific eruption (almost identical in character and degree with that which two months before had destroyed St. Pièrre). This was accompanied by vivid flashes of lightning, both single and confluent, and by a tornado of superheated steam, hot ashes and mud.

A telegram from St. Lucia dated July 10, stated: 'The R.M.S. Yare, which arrived here this evening from Martinique reports a severe eruption of Mont Pelèe last evening at 9 a.m. accompanied by vivid lightning which was visible here, and causing a panic at Fort-de-France. The English Scientists Drs. Anderson and Flett, who were near Mont Pelée, are reported to have narrowly escaped, arriving at Fort-de-France bespattered with mud.' The detonations and flashes of lightning which accompanied this eruption were also seen by several persons at Barbados.

On Friday, July 11, the members of the Commission landed at Dominica. Here they were greatly assisted by the Hon. Hesketh H. Bell, the Administrator, Dr. Nicholls, Mr. George Branch and others. Dr. Flett visited the boiling lake in the interior of the island and afterwards in company with Dr. Anderson examined the boiling and sulphur springs at Picard and other localities. Also the Soufriére on the South Western coast. Drs. Flett and Anderson returned to Barbados by the 'Eden' on July 19, and left for England in the "La Plata" on July 21.

The members of the Commission expressed themselves very highly pleased with the results of their mission, and greatly appreciated the valuable assistance everywhere rendered to them. The papers that have been kindly prepared by various correspondents containing observations relating to events that took place immediately preceding and during the recent eruptions may be addressed to the Commissioner of Agriculture for the West Indies, Head Office, Barbados. In order that the information contained in these returns may be included in the forthcoming report by Drs. Flett and Anderson, it is desirable the papers should reach the Commissioner of Agriculture not later than the 16th. instant.

Grafting Nutmegs.

The success so far attained in this operation in Jamaica, and Ceylon has been alluded to on page 69 of the *Agricultural News*. By an oversight we then omitted to mention the earlier work of Mr. J. H. Hart, who in the *Bulletin of the Royal Botanic Garden, Trinidad*, for 1894 (p. 241), reports the successful grafting of both male and female scions on to seedling stocks. In his Annual Report for 1900, Mr. Hart records the fruiting of some of the grafted plants, 'a little over five years from planting out.' He recommends grafted nutmegs for wind-blown localities to which, owing to their dwarf-spreading habit, they are more suited than ordinary nutmeg trees. To Trinidad, then, belongs the credit of the first successful attempts to graft nutmegs on seedling stock.

Jack-in-the-Box Tree.

On page 7 of the *Agricultural News* we stated that this plant *(Hernandia sonora)* was not a native of the West Indies but an introduced plant from the East. Mr. J. H. Hart has since written pointing out that it grows in the woods of Trinidad, and the Rev. H. Hutson of St. Lucy's, Barbados, has drawn attention to its occurrence in Turner's Hall wood, in that island. It must however be borne in mind that there are two very closely related species, by some botanists regarded as identical: *Hernandia peltata* found throughout the tropics generally, and *Hernandia sonora*, a native of the East Indies according to the *Index Kewensis*, whose ruling we adopted in the note in question. It would be interesting to have the identity of the West Indian species definitely established.

Whales Ashore at Antigua.

A school of young whales, twenty-eight in number, supposed to have been pursued by sword fish, became stranded on the shore at Royals Bay, Antigua. They were small specimens, the largest measuring about 18 feet in length. The blubber of one was boiled down and a quantity of oil obtained. Of the remainder some were towed out to sea and the others used as fuel and manure on neighbouring estates. A considerable quantity of oil could have been obtained had facilities for boiling down the blubber been on the spot. It is suggested these young whales might have been 'Black fish' a species of *Globicephalus*.

INSECT NOTES.

Mosquitoes.

The discoveries made during the last decade as to the part played by mosquitoes in the dissemination of diseases have drawn general attention to these insects, In the British Colonies, a general effort has been made to collect the mosquitoes, and the specimens so obtained have been studied by Mr. F. V. Theobald of the Natural History Museum, who has lately published an account of his investigations. [*A Monograph of the Culicidæ of the world.*] In these volumes Mr. Theobald describes all the known mosquitoes and gives their geographical distribution. As these volumes are not accessible to everyone, it may be of interest to give the number of species recorded from these Colonies. In compiling these figures, Mr. Theobald's list of West Indian species has been used as the basis, but additional information has been kindly added by Dr. G. C. Low, whose researches on mosquitoes in relation to disease are generally familiar in these Colonies. This list cannot claim to be complete as many of the specimens sent by Dr. Low to Mr. Theobald are being studied at present.

Perhaps the most interesting of West Indian mosquitoes are those which are instrumental in spreading disease. *Anopheles* is now regarded as an agent in spreading malarial fever, and *Anopheles argyrotarsis* therefore assumes a peculiar interest as being the common West Indian species. *Stegomyia fasciata*, the very common 'Scots-Grey' mosquito, is apparently instrumental in diffusing yellow fever, and *Culex fatigans*, the common brown mosquito, is the intermediate host of the *Filaria* which causes 'fever and ague' and 'elephantiasis.' The number of species which will be found to have this function of spreading human diseases cannot be estimated, but these three common species certainly appear to play an important part.

The total list of species for the West Indies at present is forty-one, including four not found in the British West Indies. The number found in each Colony is as follows:—

	Total number.	*Not found elsewhere.*
British Guiana... ...	18	7
Trinidad	9	2
Jamaica	12	3
Grenada	10	3
St. Vincent	12	2
Barbados	6	—
St. Lucia	15	1
Dominica	4	—
Montserrat	1	—
Antigua	6	—
St. Kitts	5	—

Further collecting will add to these figures, and a large number of species probably are awaiting record. Out of the thirty-seven species so far found, eighteen are found in one Colony only, and nine more are found only in two localities. Five only have anything like a general distribution and can be regarded as common West Indian mosquitoes. Any additions to the mosquito fauna will prove of interest, and it is to be hoped that those who have opportunities to collect in the less known islands will send specimens to Mr. Theobald, either direct or through this Department. Living mosquitoes if despatched immediately could be properly set at the office of this Department, and any specimens received will be forwarded to Mr. Theobald.

Plague of Flies at Grenada.

The Editor of *The Federalist and Grenada People* describes in somewhat facetious but graphic language the annoyance felt at St. George's by the recent invasion of myriads of flies that had taken possession of the town: 'the air is charged with their buzzings, they alight on everything... they take cooling baths in water goblets, dive recklessly into the butter-dish and frisk nimbly over the delicacies of the kitchen. Fly-paper has no alluring charms for them: they pass it with contempt... one may as well think of goading a stubborn mule as driving off a fly... the fly always comes off victorious, and sounding a triumphant buzz leaves his victim fretting and fuming at his own impotency and his failure in squelching his tormentor.'

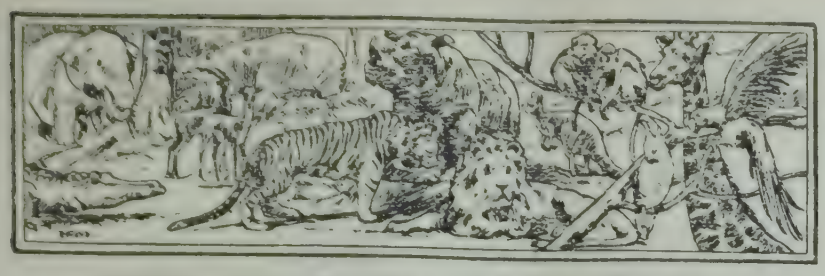
An invasion of flies of this character can very well be understood to be most troublesome and annoying. The best remedy is to attack their breeding places in stable yards, in fresh manure and in any garbage that may have escaped notice in the town. As flies can only breed in organic matter, their abundance at any time is evidence that animal refuse of some kind exists, not far away in the neighbourhood. The most effectual means of combating a plague of flies is to remove the opportunity for them to breed. It is recommended to examine closely for their breeding places and treat all refuse, and especially litter in stable yards and fresh manure, with a sprinkling of chloride of lime or other cheap and effective disinfectant.

Sapodilla Maggot.

On page 88 we mentioned that the sapodilla was sometimes infested by a yellow maggot which eventually develops into a handsome black and yellow fly. It is reported that this pest is not known in Grenada and that sapodillas from that island may be eaten without suspicion of their containing unwelcome intruders.

Duty on Arrowroot.

It should interest planters and exporters in the West Indies to know that the grain duty recently adopted by the British Parliament is somewhat far-reaching in its effect. Arrowroot, cassava starch and tapioca, potato flour and sago, come within its operation, being liable to the imposition of 5*d.* per cwt. like flour and meal. On wheat, barley, etc., the duty is 3*d.* a cwt.



THE TORONTO EXHIBITION.

The preparation and collection of specimens for the Toronto Exhibition has been proceeded with actively and the West Indian exhibits should make a striking show and afford a good representation of the varied products of these Colonies.

British Guiana: The British Guiana Institute of Mines and Forests shipped by the C.M.S. *Ocamo*, July 23, two cases containing mineral specimens, together with a set of geological maps of the Colony prepared by Professor J. B. Harrison and Mr. H. J. Perkins. The exhibits will be under the care of Mr. W. P. Kaufmann, of the Government Laboratory, both during the course of shipment and during the exhibition. By the same boat, to supplement the general exhibit, a pair of growing sugar-canes, specimens of Cassareep, Mahoe fibre, Crowattee Ink, and Cocoanut and other palm leaves were also forwarded.

Barbados: The nonperishable exhibits from Barbados put up in bottles, etc., for the Toronto Exhibition were shipped by Messrs. Pickford & Black's S. S. *Dahomé* which left on July 15. There were eight packages containing altogether 102 exhibits. These consisted of the various grades of sugar, from white vacuum pan crystals to sugar made from second grade vacuum pan molasses; samples of the different grades of molasses and of rum; samples of falernum, wormwood bitters, sorrel liquer, scraped and unscraped dried ginger; meals from cassava and guinea corn; cassava cakes, tapioca, pea-nuts, pigeon peas; specimens of Barbados manjak, petroleum oils, liquid bitumen, infusorial earth. etc., etc.

It was intended to despatch perishable articles, like sweet potatos, yams, etc., in the S.S. *Ocamo* scheduled to sail on July 29, but unfortunately quarantine regulations have prevented this project being carried out.

Tobago: A collection of fibres, starches, coffee, cacao, woods, etc., was forwarded by the S.S. *Dahomé*. It is to be regretted that steps were not taken in time to allow a representative exhibit of rubber to be sent, especially as it is now becoming an important industry in the island.

Grenada: From this island we learn that bottles containing samples of the principal products of the island were ready to be despatched together with a number of copies of the useful Grenada Hand-book for the current year.

St. Vincent: A good collection has been got together and a preliminary exhibition was to be held in the Court House on July 23, from which the best exhibits were to be selected for transmission to Canada. The recent eruption seriously interfered with the work in St. Vincent, but a good representative collection has been made.

DEPARTMENT NEWS.

Mr. Francis Watts, F.I.C., F.C.S., Government and Analytical Chemist of the Leeward Islands has recently had conferred upon him the degree of B.Sc. (Bachelor of Science) in the University of Birmingham.

Owing to quarantine restrictions imposed against Barbados the engagements of the officers of the Head-Quarters Staff of the Imperial Department of Agriculture, in the other Colonies, are cancelled until further notice.

The second number of Volume III of the *West Indian Bulletin* is now issued. It contains the papers on Educational and General Subjects read before the Agricultural Conference held in January last in Barbados. The Conference papers on the Sugar Industry were issued in the preceding number in April. The Educational papers epitomize the results of efforts made during the last three years to introduce the teaching of the principles of Agriculture into the colleges and schools of the West Indies. They were contributed by those actually engaged in the educational work in the several Colonies.

The Hon. S. Olivier's important paper on the Regulation of the Quality of Exported Fruit should be carefully studied by all fruit growers and exporters in the West Indies. Mr. Lefroy deals with the question of controlling the importation of insect pests, and shows that several islands have not yet pests which are found on neighbouring islands. The need for some method to prevent the spread of pests from one island to another and from foreign countries is clearly demonstrated, and valuable suggestions made. An exhaustive paper appears from the pen of the Hon'ble W. Fawcett, covering the botanical, agricultural and economical aspects of the Banana industry in Jamaica. Mr. J. H. Hart treats of the Essential Oils of the West Indies and discusses the possibilities of a future industry. Mr. W. G. Freeman contributes an illustrated account of the Barbados Aloe industry, worth at one time £7,000 per annum, now unfortunately almost entirely lost, although capable of being revived should conditions warrant it. The last paper is by Mr. A. Howard on methods of removing epiphytic growths from cacao and lime trees, a question of considerable importance to planters in Trinidad, Grenada, Dominica and elsewhere.

The price of the number is 6*d*. Post free 8*d*. It may be obtained from any of the local agents of the Department, a complete list of whom is given on page 127 of this number.

Coffea robusta. This is a new species of coffee from the Congo. It has flowered and fruited during the year. It produced large clusters of pure white flowers having an exquisite perfume, and bears small globular red berries. The crop produced has all been used for seed. The tree has somewhat the habit and size of leaf of Liberian coffee, but it is quite distinct from that variety. It is reported that the flavour of this coffee is superior to many other species. The trees have again flowered, and a larger crop is anticipated during the coming season. (*Annual Report*, Royal Botanic Gardens, Trinidad, 1901-2.)

POULTRY.

Mr. Barclay, the Secretary of the Jamaica Agricultural Society, has kindly promised a series of short articles on poultry, written especially for the *Agricultural News*. His notes will deal with the general usefulness of poultry, the various breeds, housing, feeding, etc., and will, throughout, be written with a view to the special requirements and circumstances of keepers of poultry, on a small scale, in the West Indies:—

IMPORTANCE OF POULTRY.

In almost every country in the world, the hen is considered an indispensable adjunct to the agriculturist; and in many countries like Ireland, France, Germany, Belgium, and Denmark, she is one of the best profit-making items of the cottager as well as of the farmer. In the West Indies we are apt to overlook, if not actually despise, the importance of a poultry industry to the country. It may not be that the West Indies will ever have an export trade in eggs, such as other British Colonies with less favourable climates have,—Canada and South Australia, for instance; but eggs and fowls are staple articles of diet, and being home-raised, the more they are in use, the better for these islands. Eggs are indeed a cheap and nutritious food, and, taking into account the amount of actual food-stuff contained in an egg and which may principally be elaborated from seeds and grubs and waste products picked up from the land, there is nothing cheaper. It is just as important to save outlay for importation of food-stuffs as to get returns from the exportation of our products. A free consumption of home-laid eggs and house-raised fowls is immeasurably better than tinned and pickled meats which are of less nutritive value.

USEFULNESS OF POULTRY.

Poultry are exceedingly useful, first for the value of their eggs, which if not sold can be used at home; secondly, their flesh is the stand-by of the good and economical country housewife. If housed at night, as they should be, their droppings are value to the extent of £3 per ton as manure, and if mixed with five to ten times its weight of earth as it should be, twenty hens will yield about one ton of rich manure in a year. They eat up countless numbers of insects, slugs, worms, etc., that might cause much damage to crops, and in a cattle-pen they delight to go among the cows and pick off the bloated ticks from the animals. Turkeys are especially useful in a pasture for this purpose. Thus, at the same time the fowls are clearing the land of pernicious insects and other pests, they are also feeding themselves, and as other food required can be grown in most districts in odd corners of a property with but little outlay, it might soon become a fact that the keeping of poultry, if done systematically as bee-keeping has been entered upon in Jamaica, and other islands, or looked after as you would look after your cultivation, would become a very profitable item on a plantation, and more especially to the small cultivator. The hen will respond here in the West Indies to care and attention just as she has responded in the United States, France, Denmark, and other countries where she is responsible for as big figures as any other item of commerce, or agricultural industry. She may, standing alone, be a humble item and worth only about 2*s.* 6*d.*, but she and her kind were responsible for two billion twenty five-million eight hundred thousand eggs imported into Great Britain from foreign producers last year, and five-and-a-half million pounds sterling were paid for these eggs to—Russia, £1,109,533; Germany, £1,106,719; Denmark, £923,551; France, £868,123; Belgium, £733,453; and various other countries £750,000 between them. So that all these countries are exceedingly indebted to the hen for the receipt of so much solid British cash, and Britain is as much indebted for the eggs, without which, a breakfast table there would seem blank. The American hen, too, is a diligent earner and producer of wealth, as the amount realized for eggs and fowls in the United States in one year amounts to the huge sum of $290,000,000, which is far greater than all the silver and gold produced from all the mines in the United States,—greater than the value of the sheep industry, the cattle industry, the wheat crop, cotton crop, everything, except the value of all the horses which amounts to $500,140,186. The production of eggs in the United States, all consumed at home, amounts to 9,856,674,922. There are no figures available for the West Indies, but I make a conservative estimate, that there are two millions of feathered stock in Jamaica; that one hundred million of eggs are produced yearly, and that the market value of these, at an average of three farthings each, amounts to £312,500, and the value of the fowls, at an average price of 2*s.* each (of course, turkeys, ducks, geese, and guinea fowls average far more), amounts to £200,000—making a total value to the island of poultry products of over £500,000. The value of horse-stock in Jamaica is £460,280, and of cattle £607,795.

BEE-KEEPING.

Stingless Bees.

In the *Agricultural News* of May 24, (p. 40) attention was drawn to the fact that stingless bees were not uncommon in the West Indies, and that a colony was to be seen in the Dominica Botanic Station. The native bee of Tobago is also reported to be stingless. Four colonies, of two species, which were caught in the island are now to be seen working at the Botanic Station. As to the prospects of the bee-industry in Tobago, the Curator of the Botanic Station writes: 'Logwood and other honey plants which are an important element in bee culture occur generally distributed throughout the island, and with the introduction of Italian queen bees the industry should prove an important one.'

Lizards and Bees.

Mr. W. N. Sands, the Curator, reports an interesting observation made at the Botanic Station Apiary at Antigua in regard to lizards and bees, which seems to indicate that lizards eat the drone bees in preference to workers. In several instances it was observed that as soon as a drone alighted on the entrance board of the hive, even among a large number of worker-bees, he was snapped up by the lizards. The drone, it might be remarked, is without a sting. This discrimination on the part of the lizard is beneficial to the Apiary. Whether Queen bees will not also be killed is a matter for further observation.

EDUCATIONAL.

Jamaica.

LECTURES TO TEACHERS' ASSOCIATIONS.

The following extract is taken from the Report of Mr. W. R. Buttenshaw, M.A., B.Sc., the Lecturer in Agriculture, Jamaica, to the Board of Agriculture :—

During February and March I visited the following places and addressed the teachers : Montego Bay, Point Hill, Linstead, Frankfield, Highgate and Mizpah (N. Manchester). In no case did the teachers fail to turn out in good numbers and show considerable interest in the lectures, the audiences at Linstead and Mizpah being particularly large. From the questions and discussions at the close of the lectures it was very evident that the teachers desired to get all the possible assistance in introducing Nature Study into their schools. It was encouraging to find that a large number of them, especially perhaps in the Linstead districts, were starting school gardens. One told me that the profits upon the workings for the first year had been sufficient to enable him to purchase a complete equipment of tools for the pupils. It seemed to me that the men who have left the Mico during the last two or three years were particularly prominent in this practical work. At Frankfield and Mizpah there was also a good attendance of school managers. At the latter meeting a short address was given by Colonel Hicks,

Barbados.

PRIZES FOR PLANTS GROWN BY CHILDREN ATTENDING ELEMENTARY SCHOOLS.

In order to encourage the cultivation of plants grown by children attending elementary schools, the Education Board at Barbados has issued a list of prizes to be offered by the Imperial Department of Agriculture at the next Local Exhibition to be held at Todds' Plantation, on January 13, 1903. Before any prize is awarded, it is necessary that a certificate be presented from the supervising Minister, or members of the School Committee or the Schoolmaster of the school, at which the child attends, certifying that, from his personal knowledge, the exhibit was entirely planted and cared for by the exhibitor. There are fifty prizes offered, varying in value from two dollars to twenty-five cents each.

In order to assist the children in growing plants of a useful character, small packets of vegetable seeds will be forwarded for distribution in each school. The plants may be shown in small barrels, tubs, pots, or boxes.

British Guiana.

ENCOURAGEMENT FOR STUDIOUS TEACHERS.

The following extract is taken from a report of the proceedings of the meeting of the Board of Agriculture of British Guiana, of Tuesday the 8th instant :—

The Secretary laid on the table certain copies of the *Agricultural News*, and a report on the Botanic Station and Agricultural School at Dominica.

Professor Harrison, referring to the *Agricultural News*, moved the following resolution :—

Be it resolved,—That to mark this Board's appreciation of the manner in which those teachers who were placed in honours and in the first-class at the recent examination in the elements of agricultural science, and who are now attending the Board's demonstration classes have utilized the opportunities for study offered to them, and to assist them in the continuance of such studies, the Board recommends that each teacher be supplied with copies of the *Agricultural News* issued during the Financial year 1902-3.

'It is considered,' he said, 'that for those schoolmasters who have done their utmost it will be an encouragement, and of very great assistance to them to know exactly what is taking place in the West Indies, and also enable them to get certain information in regard to work elsewhere. They will probably talk over it with their friends and lend them their copies, and in this way we think that a good deal of information may be disseminated.'

Mr. Jones seconded, and the motion was carried.

'The Natural History of Plants.' Messrs. Blackie and Sons announce the re-issue of the translation, by Professor F. W. Oliver and others, of Kerner's Natural History of Plants, in sixteen monthly parts, at 1*s.* 6*d.* each net. The English edition of the work originally appeared in sixteen parts at 2*s.* 6*d.* each. This fascinating book, which is profusely illustrated, can be cordially recommended to all lovers of plant life. It treats of plants as living things, full of ingenious devices to overcome the difficulties of their surroundings.

AGRICULTURAL SOCIETIES.

Antigua.

Mr. W. N. Sands, the Hon. Secretary, has forwarded an account of the usual monthly meeting of the Society, held on the 4th ultimo, from which the following items of interest are reproduced :—

The Agricultural Show for the current year was proposed to be held in December next.

VANILLA IN ANTIGUA.

Mr. Sands briefly outlined the methods of propagating and growing Vanilla, illustrating his remarks by specimens. He advocated the use of Physic nut *(Jatropha Curcas)* as the best support for the vines, and pointed out that vanilla can be grown readily in parts of Antigua, and thrives in St. John's. Green pods, $7\frac{1}{2}$ inches long, gathered from a vine growing in a garden at St. John's were exhibited. A limited number of young plants were available at the Botanic Station where further information concerning vanilla cultivation could be obtained.

Mr. Watts expressed the opinion that there was a considerable area available for vanilla cultivation within the town of St. John's itself ; that the shelter afforded by the houses, and the somewhat damp atmosphere of the town were favourable, and that a minor industry was thus brought within the reach of all classes of residents in the town.

ARBOR DAY.

The question of establishing an Arbor Day, already discussed in the *Agricultural News* (pp. 49 and 55), was brought forward by Mr. Watts, and it was agreed that, for this year at least, November 9, the King's birthday should be observed as an Arbor Day throughout the island, and that the Agricultural Society and other bodies in Antigua, as well as masters, mistresses and managers of schools of all grades should be invited to give their cordial support to the scheme. It had been the intention to include tree planting in the Coronation festivities on June 26, last, but the suggestion was not brought forward in time to allow of the organization of proper schemes.

Molasses as a Food for Army Horses.

(Continued from p. 108.)

On April 18 No. 3 stumbled on a stone and strained the superficial flexor of the off fore, necessitating his remaining in the stable for seven days; during this time he gained 12 lb. in weight.

On April 29 a barrel of fermenting molasses was delivered in the evening; on the morning of the 30th this molasses was fed at the regular time. As the customary monthly muster was to be held at 7 o'clock, the usual work was postponed until later, and all the horses turned out for this function; they behaved in a most scandalous manner, breaking up the ranks, smashing up things at the reviewing point and even dismounting the saddler Sargeant, who was an expert horseman. Query: Had the fermenting molasses anything to do with it?

Commencing with February 5, it was noted that the fæces were becoming quite dry and the animals had difficulty in defecating; to correct this we had to give a little bran on the 11th, which was partaken of greedily; it had the desired effect and had to be repeated on an average of every two weeks.

TRIAL ON SICK HORSES.

It was noticed in Porto Rico that the young horses were those that kept the sick report full all of the time, while horses of seven and over were seldom reported; the trouble was usually of a digestive nature, with its consequent "out-of-condition" scratches, skin abrasions, etc. Four of these cases were chronic sick report horses and could not be braced with the usual drugs, except for a few days. On February 3 all of them were suddenly deprived of their grain and hay and put on a ration of 6lb of molasses and 20lb of green grass daily. They refused the molasses for two days, but hunger being a fine stimulant to the appetite, on the morning of the 6th we were gratified to see that everything had been cleaned up. (No, their teeth were not in poor condition; we were positive of this, as we noted it on the record.) Strange to relate, these animals commenced to pick up immediately, and within ten days they improved so wonderfully that their riders failed to recognize them. These horses did their usual troop work, which was light. After living a month on this ration they were, as suddenly, returned to their hay and oats. Both of them suffered with indigestion for several days, but otherwise the sudden change was not injurious. We were under the impression that we would certainly have some acute digestive disorder on the sudden change from dry to green feed and molasses, but none appeared that could be observed. We were not surprised at the indigestion on going back to the dry feed.

GENERAL RESULTS.

All of the horses partaking of the molasses, including the four sick ones, improved in spirit, coat, condition, wind and flesh, and looked better than any of the other horses in the garrison. Remembering that they (the eight) accomplished considerably more work and under more unfavourable conditions, apparently, and that they probably received less grooming, the results, as observed, are certainly astonishing.

We will not go into the relative nutritive qualities of foods, as we are positive very few of those who peruse this would care to read it, but I will remark that the grass raised on the island of Porto Rico is very innutritious, consisting of little but water and cellulose; as a consequence, the pastured cattle are large of abdomen and watery and stringy of muscle. The ox, which is the draft animal of the country, is fed on the tops of sugar-cane and in many ways has his ration of the innutritious grasses added to.

On ending the experiment the horses were gradually restored to their usual ration of 12lb of oats and 14lb of hay daily, which they ate greedily.

So much interest was shown in the experiment that not a single question was ever asked as to its results, or if molasses was of any value as a food for horses. As this is the first time the result of the experiment has been put on paper, it may be of some interest to veterinarians. We do not claim originality for this ration, it having been in constant use on the island of Porto Rico from time Immemorial.

COST.

Army horses in the West Indies when the regular ration is not obtainable, can be subsisted without loss of flesh or vitality on grass and molasses, both of which are cheap and easily obtainable. The average price per day for the grass and molasses rations was 15 cents, that of the regular ration about 27 cents. The price of molasses depends upon the season, it being cheapest when the cane is being ground.

Thirty-five pounds of grass and from 13 to 15lb. of molasses as a daily allowance are sufficient to maintain a horse of 1,000 lb. weight in good working condition in a climate similar to that of Porto Pico.

On this ration animals appear to do more work, condition and coat improve, there is less tendency to perspiration, wind decidedly improves, urine increases but slightly, bowels have a tendency to constipation, which is easily corrected by feeding of a few pounds of bran at stated intervals.

Sudden change from dry to this ration is not at all injurious, and does not derange the digestive apparatus. On changing to a dry ration it should be done gradually, or serious consequences may arise.

Molasses attracts insects, notably flies and ants; it sticks to the animal's coat, smears his face and breast, halter and halter strap, soils the clothing and the equipment of the men, and causes some trouble and delay in mixing it with the grass, which must be cut fine. It is believed that molasses in small quantities in the United States could be used to good advantage in the treatment of sick horses recovering from some debilitating disease, also in cases of animals suffering from dyspepsia where the coat is rough and skin harsh and tight, as well as in horses with chronic indigestion that will not respond to the usual tonics.

If molasses as a feed or partial feed be used by any of your readers with a therapeutical object in view, it is hoped he will place the result of his observations at the disposal of the profession.

To Destroy Ants on Lawns.

We find certain small species of ants that make their hills in our lawns and gardens, or in grass-plots and are sometimes decidedly troublesome in such localities. Dr. John B. Smith in *Economic Entomology* (p. 395) advises where this occurs there is nothing better for getting rid of them than bisulphide of carbon. Pour, he says, a quantity into each of the openings of the disk or hill, closing them up by stepping on each as it is treated. The fumes will penetrate the chambers in every direction, and if a sufficient amount has been used, will kill not only the adults, but all larvae as well. A single application is usually all that is necessary; but in a very large colony it may sometimes happen that the farther chambers are not reached by the fumes, and that the nest reappears near by; rarely in the old spot. When that occurs, a second treatment is tolerably certain to be effective.

TRINIDAD: ANNUAL REPORT OF THE GOVERNMENT ANALYST 1901-2. By Professor P. Carmody, F.I.C., F.C.S.

The report deals principally with the routine analytical work of the Colony, many of the details of which are only of local interest. 2,210 analyses chiefly official, were made. In connexion with the reported discoveries of mineral oil in Trinidad, some samples of which were analysed at the laboratory with favourable results, it is interesting to note that nearly half a million gallons of petroleum are annually imported into the Colony. Ten samples of aerated waters were found to contain excessive quantities of lead, and two brands of imported beers were found to contain Salicylic acid in small quantities. Several analyses of local coals are given the majority of which compared with imported coals of the best quality contain an excessive amount of water and ash as well as a high percentage of volatile matter. Although none of the local coals are of first class quality, some of them can be used with advantage. Of great interest to cacao and coffee planters are the analyses of the flowers of various shade trees used in cacao culture in Trinidad. In 1900 as much as 6 per cent. of nitrogen was found in the *dried* flowers of some samples of the Immortel: this year the highest figure is 4·03 per cent., the lowest being apparently 2·65 per cent. It was found that an average-sized tree yields about 130 lb of fresh flowers. Fifty trees per acre would yield 800 lb of dry flowers, which at 3 per cent. of nitrogen only would yield 24 lb of nitrogen. This is nearly double that removed by 500 lb of cured cacao per acre. Speaking of these figures, Professor Carmody says: 'These figures are of considerable agricultural importance, for they suggest that flowering trees may be utilized to keep the nitrogen in the soil in circulation by bringing it from lower depths in one form and periodically spreading it in another form on the surface of the land.'

A course of lectures in agricultural chemistry was given to a class of 56 schoolmasters. All the head teachers in Trinidad have now received a short course of instruction and in every school in the Colony agriculture is being taught. There can be no doubt that the Government Laboratory at Trinidad is of considerable service to the Colony in many ways, and amply fulfils the purposes for which it is maintained. During the year a considerable sum of money was paid into the Treasury for fees for analyses, and in addition still larger sums were obtained by fines under the Food and Drugs Ordinance.

TRINIDAD: REPORT ON THE GOVERNMENT STOCK FARMS, 1901-2. By Mr. C. W. Meaden, Manager.

The report deals with the work of the farm since its transference from St. Clair to Valsayn, St. Joseph. Many difficulties arose in converting the old sugar land now at the disposal of the farm into suitable pasture. At present many of these initial difficulties have been overcome and the farm is being gradually established. Seven pure-bred Zebu heifers have been added to the herd and a bull and two cows are on their way from India. The milch herd has been increased to 147 breeding cows. Cross-bred Guernseys have proved useful and a Hereford bull has been added. The annual stock sale was held on January 21 and realised 1,282 dollars. Most of the stock shown at the Exhibition of the Agricultural Society gained prizes in addition to the Diploma of the Department of Agriculture. Butter-making has been started; 1,668 pounds were made which sold for £138. 18. 9. The butter produced compared favourably with the imported article and much more could have been disposed of.

Mule breeding has been started at the farm but the manager does not regard horse breeding as likely to yield any profit in Trinidad at the present time. The Tamworth pigs introduced have adapted themselves to the climate and the introduction is regarded as a very useful one. The advantage of pig keeping in Trinidad as an industry for peasant proprietors seems to be clearly realized. Andalusian fowls and Pekin ducks are very promising. The sheep at the Tobago farm imported from Halifax have not done well and the manager is of the opinion that it is better to improve the native breed by importing rams from time to time. There can be no doubt that the Trinidad stock farm is a highly practical and useful institution and of considerable service to the Colony. The failures at such a farm are often more valuable than the successes as the former prevent losses to individual planters who may wish to experiment in animal introduction. All interested in stock in the West Indies would do well to secure copies of this and previous reports.

COSTA RICA: THE TRADE OF, FOR THE YEAR 1901. Diplomatic and Consular Report, No. 2776, April 1902.

The staple agricultural products of Costa Rica are coffee, bananas, timber and rubber.

The coffee crop of 1901, although abundant in quantity was poor in quality; prices ruled 25 to 30 per cent. lower than during the previous year, and the value of produce exported fell by some £200,000. Coffee has formerly borne an export tax of 4*s.* per 100lb. This has been found to be too heavy a burden to allow the growers to maintain good cultivation, and has been abolished from September 1901.

The banana trade continues to increase. The exports for 1901 are 13 per cent. more than in 1900, and 1,000 times greater than ten years ago. Nearly 4,000,000 bunches were sent to the United States. Bananas are grown on the alluvial lands of the Atlantic Coast, carried by rail to Limon and shipped thence to America. The United Fruit Company maintain a tri-weekly service of special banana boats. Five other lines of steamers also call regularly. The Fruit Company have built a railway from the banana district to the port, and a new wharf, costing over £80,000, has been constructed at Port Limon. The banana farms are mainly worked by coloured labour from Jamaica, a man's wages being about 2*s.* 10*d.* per day.

The exports of timber and dye-woods have each declined about 50 per cent. owing to the increased difficulty in working the more remote districts.

The export of about 450 cwt. of cacao is recorded. This is more important than the mere quantity would suggest. The Government has been endeavouring to stimulate this industry by offering premiums for trees of three or more years old. In 1901 the plantations were inspected and nearly 500,000 trees earned the reward. As these plantations come into bearing, cacao may be expected to take a leading place in the exports of Costa Rica.

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is desirable that inquiry be made, beforehand, as to the terms on which such produce will be received, and whether the market is favourable or not.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—July 8, 1902.—Messrs. J. Hales Caird & Co., Messrs. Gillespie Bros. & Co. and The Public Ledger, June 26, 1902.

Aloes—Barbados 13/- to 35/-; Socotrine 70/- to 80/- per cwt.
Arrowroot—St. Vincent, fair 4*d* per lb.
Balata—Demerara sheet 2/4½ per lb.
Bees-wax—Jamaica, fair palish £7 17*s* 6*d* to £8 per cwt.
Cacao—Trinidad, good red 65/- to 66/-; fine 67/- to 68/-; choice 72/- per cwt.
Grenada, 60/- per cwt.
Jamaica, fine 62/6 per cwt.
Cardamoms—1/10 to 2/3 per lb.
Cassia Fistula—5/6 to 35/- per cwt.
Castor Oil—4½*d* to 4¾*d* per lb.
Coffee—Jamaica, ordinary 35/- to 38/-; good bold low middling 47/6 to 51/6 per cwt.
Costa Rica, 44/- to 77/- per cwt.
Peaberry, 62/6 to 65/- per cwt.
Cotton—Carriacou, 4⅞*d*. per lb.
Cotton Seed—£7. 1. 3. per ton ex ship.
Cowage—1*d* to 2*d* per lb.
Fustic—Jamaica, quiet.
Ginger—Jamaica, fair bright 43/- to 45/6; good common 33/6 to 35/6 per cwt.
Honey—No sales. Steady at previous rates.
Jalap—4*d* to 6*d* per lb.
Khus-Khus Root—12/- per cwt.
Kola Nuts—1*d* to 4*d* per lb.
Lime Juice—Raw, 1/3 to 1/5 per gallon with a firm market; concentrated, £12. 5*s* per pipe.
Logwood—Jamaica £4 5*s* per ton.
Mace—1/- to 2/6 per lb.
Nitrate of Soda—Refined £9 5*s*; ordinary £9.8*s* per ton.
Nutmegs—140's to 100's, 6½ to 9*d*; 100's to 60's 9*d* to 2/4 per lb.
Oil of Limes—Distilled 1/9 per lb.; hand pressed none offering.
Pimento—2⅝*d*. per lb.
Sarsaparilla—no quotations.
Sugar—Muscovado 10/9 to 12/6; crystallized 13/- to 15/- per cwt.
Sulphate of Ammonia—Grey, 24 per cent., London £12. 10*s* per ton.
Tamarinds—No sales reported.
Tonquin Beans—9*d* to 2/9 per lb.
Fruit—Covent Garden Market (Gardener's Chronicle, July 5, 1902.)
Bananas—6/- to 10/- per bunch.
Lemons—13/- to 18/- per case.
Mangos—2/- to 4/- per dozen.
Oranges—18/- to 20/- per case.
Pines—3/6 to 5/- each.

New York,—June 13, 1902.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaica, 9 hands $1.30, 8 hands 95c.. 7 hands 60c. to 65c. per bunch.
Cacao—African 12¾c. to 13c.; Caracas, fair to good ordinary 14c. to 14½c.; Jamaica, good fermented 11¾c.; Grenada 13¼c. Trinidad 13c. to 14c. per lb.
Cocoa-nuts—Jamaicas, $20.00 per M.; Small Trinidads $12.00 per M.
Coffee—Rio, good ordinary 5¼c.; Jamaica ordinary 6c.; good ordinary 7c per lb.
Ginger—8c. to 8½c per lb.
Pimento—5¼c. to 5½c. per lb.
Rubber—Nicaragua Scrap 51c. per lb; sheet 46c. per lb.; Guayaquil Strip 48c. per lb.
Sugar—Muscovado, 89°, 2⅞c. to 3c.; centrifugals, 96°, 3 7/16c per lb.

INTER-COLONIAL MARKETS.

Antigua,—July 16, 1902.—Messrs. G. W. Bennett, Bryson & Co., Ltd.

Molasses—9c. per gallon, package included.
Sugar—Muscovado $1.02½ per 100lb., nominal.

Barbados,—July 19, 1902.—Messrs. T.S. Garraway & Co.

Arrowroot—good quality, $3.50 per cwt.
Cacao—$13.50 per cwt.
Coffee—Jamaica and ordinary Rio $9.00 and $9.50, respectively.
Hay—lotting $1.00 per 100lb.
Manures—Nitrate of Soda $60.00 per ton. Sulphate of Ammonia—$75.00 per ton.
Molasses—8c. per gallon and $4.00 for package.
Onions—Madeira $2.00 per 100 lb.
Potatos—$3.00 per barrel.
Rice—Ballam $4.90 per bag; Patna $3.75 per bag.
Shalots—12c. to 14c per lb.
Sugar—in hogsheads, $1.00 per 100lb. and $5.00 for hogshead; in bags $1.20 per 100lb.

British Guiana,—July 17, 1902.—Messrs. Weiting & Richter.

Arrowroot—$8.00 per barrel.
Cacao—native 11c. to 12c. nominal.
Cassava Starch—$6.00 per barrel.
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica 11½c. to 12c. per lb. (retail.) Creole, 11c. to 12c. per lb.
Eddoes—$1.20 per 100lb.
Onions—sold out at 4c. per lb.
Pea Nuts—Curacoa 3½c. to 3¾c. American 4½c. (retail.)
Plantains—16c. to 32c. per bunch.
Potatos English—$4.00 to $4.50 per barrel.
Rice—Ballam $4.80, Patna $5.80 per bag.
—Creole Rice 20c. per gallon, (retail.)
Sweet Potatos—Barbados $1.32 per 100lb.
Tannias—$1.56 per 100lb.
Yams—10/- per 100lb.
Molasses—Vacuum Pan yellow 14½c. to 15c. per gallon, casks included.
Sugar—Dark Crystals $1.60; yellow $2.10 per cwt.
Timber—Greenheart 32c. to 40c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—July 16 & 17, 1902.—Messrs. Gordon Grant & Co.
and Messrs. Edgar Tripp & Co.

Cacao—Ordinary $13.00 to $13.25; estates $13.50 to $13.75 per cwt.
Balata—no quotations.
Coffee—Venezuelan. Ordinary 7¼c. per lb.
Onions—$2.00 per 100lb.
Potatos English—$2.00 to $2.25 per 100lb.
Rice—Yellow $4.50 to $4.65; White Table $5.25 to $5.75 per bag.
Sugar—For Grocery use, $1.70 to $3.00 per 100lb.
Molasses—No quotation.

Publications on sale of the Imperial Department of Agriculture

FOR THE WEST INDIES.

The 'WEST INDIAN BULLETIN.' A Quarterly Scientific Journal.

Volume I contains full reports of the West Indian Agricultural Conferences of 1899 and 1900 ; also papers on Moth-borer, Sugar-cane experiments, Agricultural education, Cacao diseases, etc.

[As only a very limited number of copies of this Volume are now available, the parts can no longer be sold separately. Volume I complete, in the original paper covers as issued, post free, 5*s.*]

Volume II contains the report of the Conference of 1901, with the President's Address, papers on the Sugar Industry, General and Educational subjects in full. Amongst the topics treated of are recent Experiments with Sugar-cane, Sugar-cane diseases, Rubber planting in the West Indies, West Indian Fisheries, Cacao diseases, Rice, Sweet potatos, Citrate of Lime, etc. The Volume is illustrated by two coloured plates and other illustrations. Price post free, 2*s.* 9*d.*

Volume III. Number I. Agricultural Conference of 1902 ; President's Address, Minutes of the proceedings and papers relating to the Sugar Industry and Agricultural Boards, and the Report of the Chemical Section. Price 6*d.* Post free, 8*d.*

Number 2. Conference Papers on Educational and General Subjects. Price 6*d.* Post free 8*d.*

PAMPHLET SERIES.

The Pamphlets are written in a simple and popular manner and the information contained in them is especially adapted to West Indian conditions. They contain amongst other subjects, summaries of the results of the experiment work on sugar-cane and manures, the full official reports of which have only a limited circulation. The following list gives particulars of all the pamphlets which are still available. The missing numbers are out of print and can no longer be supplied :—

(3.) Seedling and other Canes at Barbados 1900. Price 2d. Post free 2½*d.*
(5.) General Treatment of Insect Pests, 2nd Edition Revised Price 4*d.* Post free 4½*d.*
(6.) Recipes for cooking Sweet Potatos. Price 2*d.* Post free 2½*d.*
(7.) Scale Insects of the Lesser Antilles. Price 4*d.* Post free 5*d.*
(8.) Cultivation of Vegetables in Barbados. Price 2*d.* Post free 2½*d.*
(9.) Bee-keeping in the West Indies. Price 4*d.* Post free 5*d.*
(10) Manures and Leguminous Plants at Barbados, 1898-1901. Price 4*d.* Post free 5*d.*
(11.) Hints for School Gardens. Price 2*d.* Post free 2½d.
(12.) Seedling and other Canes in the Leeward Islands, 1900-1901. Price 2*d.* Post free 2½d.
(13.) Seedling and other Canes at Barbados, in 1901. Price 4*d.* Post free 5*d.*
(14.) Screw worm in Cattle at St. Lucia. Price 2d. Post free 2½*d.*
(15.) Plain Talk to Small Owners Price 2*d.* Post free 2½*d.*
(16.) Hints on Onion Cultivation. Price 2*d.* Post free 2½*d.*

'NATURE TEACHING.'

A text book based upon the general principles of Agriculture for the use of schools, prepared by the Honourable Francis Watts and others. (Pages XII and 199) The Plant, the Soil, Plant food and Manures, Weeds, and Insects are successively treated, and the information given is illustrated throughout by simple experiments which can readily be carried out in an ordinary school. Tne Book is mainly intended for the use of Teachers. Price, limp cloth 2*s.*, or in a superior style of binding 2*s.* 6*d.* Postage in either binding, 3½*d* extra.

The 'AGRICULTURAL NEWS' A Fortnightly Review.

The 'Agricultural News' contains extracts from official correspondence and from progress and other reports ; notes on interesting points connected with the work carried on at the Government Laboratories, Botanic Stations, Experiment Stations, Agricultural Schools, Experiment plots, School Plots, Agricultural Shows, Lectures to teachers, etc., the occurrence of disease, the arrival of new plants and animals, the flowering and fruiting of plants of special note, the appointment, promotion and removal of officers, the weather, and, in fact, any information indicating what is going on in each Colony and the progress made in Agricultural matters throughout the West Indies.

The 'Agricultural News' is printed in time to be distributed, regularly, by each mail, and is on sale by the local agents of the Department at one penny per number, post free 1½*d.* The subscription price, including postage, is 1*s.* 7½*d.* per half-year, or 3*s.* 3*d.* per annum. *All applications for copies are to be addressed to the Agents, not to the Department.*

Agents.

The following have been appointed agents for the sale of the publications of the Department :—

London: Messrs. Dulau & Co., 37, Soho Square, W. *Barbados:* Messrs. Bowen & Sons, Bridgetown. *Jamaica:* The Educational Supply Company, 16 King St., Kingston. *British Guiana:* 'Daily Chronicle' Office, Georgetown. *Trinidad:* Messrs. Munro & Co., Frederick St., Port-of-Spain. *Tobago:* Mr. C. L. Plagemann, Scarborough. *Grenada:* Messrs. F. Marrast & Co., 'The Stores,' St. George. *St. Vincent:* Mr W. C. D. Proudfoot, Kingstown. *St. Lucia:* Mr. R. G. McHugh, Castries. *Dominica:* Messrs. C. F. Duverney & Co., Market St., Roseau. *Montserrat:* Mr. W. Llewellyn Wall, Plymouth. *Antigua:* Mr. F. Forrest, St. John's. *St. Kitts:* Messrs. S. L. Horsford & Co., Basseterre.

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Total Assurances Issued	$11,752,403
Total Bonuses Declared (31 December 1900)	3,610,921
Sums Assured and Bonuses Existing	5,154,157
Total Claims by Death and Matured Endowments	5,375,545
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Annual Income	245,345
Net Surplus December (31 1900)	297,124

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May 22, 1902.

H. J. INNISS,
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A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. I. No. 9. BARBADOS, AUGUST 16, 1902. PRICE 1*d.*

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West Indian Bulletin.

THE publication of the July number (Vol. III, No. 2) of the *West Indian Bulletin*, the quarterly Scientific Journal of the Imperial Department of Agriculture for the West Indies, affords a convenient opportunity for drawing attention to the extent to which the *Bulletin* might be utilized as a means for improving the agricultural resources of these Colonies. Each number contains about one hundred pages of original matter, all directly bearing on West Indian conditions and written by men of wide experience and undoubted authority on the subject on which they treat. The four numbers issued, each year, form a volume of about four hundred pages with a title-page and index complete. The articles that have already appeared deal with several important questions affecting the sugar industry and present a summary of the latest results of experiments carried on in the West Indies and in all the leading sugar-cane growing countries of the world. It is not too much to claim that the *West Indian Bulletin* is indispensable to every progressive sugar planter in these colonies and it is the planter's own loss if he does not fully avail himself of the valuable information so plainly worded and conveniently placed within his reach. Similarly with regard to the cacao industry which, next to sugar, is the most important of any in this part of the world. An exhaustive series of articles on the fungoid and insect diseases of cacao has appeared in the *West Indian Bulletin* with clear and practical hints for dealing with them whenever and wherever they occur.

In the current number of the *Bulletin* the first article recounts the results of efforts, during the last three years, to introduce the teaching of the principles of agriculture into the colleges and schools in the West Indies. The several colonies dealt with, according

to their geographical position, are Jamaica, British Guiana, Trinidad with Tobago, Grenada, St. Vincent, St. Lucia, Barbados and the Leeward Islands. Immediately after, follows the Report of the Educational Section at the Conference of 1902. Mr. Sydney Olivier, C.M.G., the capable and energetic Colonial Secretary and Chairman of the Agricultural Board at Jamaica contributes an important paper on the 'Regulation of the quality of exported Fruit'; Mr. H. Maxwell Lefroy, F.E.S., deals with 'Suggestions for controlling the importation of Insect Pests,' followed by a valuable paper by Mr. W. Fawcett, F.L.S., on the 'Banana Industry of Jamaica.' There can be no doubt as to the thoroughly exhaustive and useful character of this paper, and, in view of the possible extension of the banana industry into the Lesser Antilles the article will be read with great interest in those islands. It is evident from what is being done at Jamaica that successful banana cultivation requires quite as much skill and forethought as cane cultivation. Mr. J. H. Hart, F.L.S., discusses the 'Preparation of Essential Oils in the West Indies'; Mr. William G. Freeman, F.L.S., gives an interesting account of the 'Aloe Industry of Barbados'; and Mr. Albert Howard, F.C.S., F.L.S., concludes with 'Suggestions for the removal of Epiphytes from Cacao and Lime trees.'

It may be added that the *West Indian Bulletin* is readily obtainable (price sixpence, post free eight pence) from all Agents of the Department throughout the West Indies. The London Agents are Messrs. Dulau & Co., 37, Soho Square, W.

PINE-APPLES

PINES WITH COCKSCOMB HEADS.

Pine-apple growers in Jamaica have been disturbed recently by the pines forming, at times, large, flattened 'cockscomb' tops instead of the normal crowns. It was feared that such monstrosities might be handed on from generation to generation, and hence the use of suckers from these plants was looked on with suspicion. Mr. H. H. Cousins in discussing the question says:—

It has been proved by direct experiment that suckers and even off-shoots from the crowns of monstrous or 'cockscomb' pines develop normally under healthy soil-conditions. The monstrosities are caused by the overcharge of nitrogen due to the mechanical and chemical conditions of soil on which the pines had been grown. Magnificent Cayennes have been grown on some soils this year where the previous crop had largely consisted of monstrosities. It was thought at first that a nematode worm was involved, but no evidences of such injury could be obtained, and the foregoing results confirm the opinion formed last September.

CACAO.

APPEARANCE OF PODS AS TEST OF QUALITY.

The question of attempting to use the external characters of a cacao pod to determine the colour and value of the seeds inside it, is commented on in recent reports from Jamaica and Ceylon. In the *Annual Report* on the Jamaica Botanic Department for 1901-2, Mr. W. Fawcett says:—

A chemist who has studied cacao in the various West India Islands where it is grown, states that he has formed the opinion that not much dependence can be placed on the form of the pod in making choice of good seed. One seed in the pod should be cut, and the colour noted. This he thinks is a more reliable test than the form of the pod. For flavour he prefers the white colour in the interior of the seed. But if this kind of cacao is produced by a tree not so vigorous as that yielding seeds with red or purple colour, at any rate the light pink colour is preferable to the purple colours.

Mr. J. B. Carruthers, of the Botanic Gardens, Ceylon, has been devoting considerable attention to the subject, and in his annual report for 1901-2 says:—

The external shape and size of the fruit affords no criterion as to the commercial value of the seed within, and may often be a most misleading character. The pods examined—more than 1,000 in all—were of all kinds and varieties and on different estates. They were all measured accurately, both length ways and around the thickest part, and weighed; then they were opened and the number and weight of the seeds and the weight of the fruit-wall recorded.

EXPERIMENTS WITH TOBACCO AT ST KITTS.

Considerable interest is being taken in the cultivation and curing of tobacco in St. Kitts. (See p. 53). In the Annual Report on the Botanic Station, recently issued, Mr. W. Lunt, the Curator, records the steady progress of the experiments. About half an acre was grown near the Station, and the resulting crop is being carefully cured, and 'promises well for a first venture.' Plots of tobacco were also started on four estates. The final results of these experiments are awaited with interest. Meanwhile it is gratifying to learn that an independent private experiment, on a small scale, has been carried through successfully, by Mr. William Sprott, a schoolmaster of Basseterre, St. Kitts. He planted a garden plot, 40 ft. by 25 ft., with plants raised from seed gathered from tobacco plants found growing in different localities in the island. The plants were set 2 ft. 6 ins. apart, in rows 3 ft. apart. They were given great care and attention and grew rapidly, producing leaves 3 ft. long by 6 inches wide. Most of the plants produced from fourteen to twenty pairs of leaves. When mature the leaves were harvested and carefully cured, as far as possible in accordance with the Cuban method. The cured tobacco was pronounced by several persons who smoked it, either in pipe or made into cigars, to be better than tobacco obtainable locally. This experiment goes to show, that tobacco plants grown at St. Kitts, cultivated and cured under favourable conditions, are capable of producing a fair quality tobacco.

SUGAR CROPS OF BARBADOS.

The following Memorandum has been prepared by Mr. J. R. Bovell, the Agricultural Superintendent of Sugar-cane Experiments, on the Sugar and Molasses crops of Barbados for the four years 1899–1902 inclusive.

It should be understood that the returns are approximate only, as it has not been found possible to obtain figures from every plantation in the island. It will be observed that the average cost of producing a ton of sugar and 100 gallons of molasses, on 75 per cent. of the plantations in Barbados, during the last ten years is placed by Mr. Bovell at £12 8*s.* 7*d.* On many plantations where the conditions are favourable the cost is less. On the other hand, in some districts, especially in the Scotland district, it is higher.

The most prominent feature in these returns is the fact that at the average prices for this year (1902) the planters apparently sustain (where no material reduction has been made in the cost of production) an average loss of £4 on every ton of sugar and 100 gallons of molasses exported from the island :—

Sugar and Molasses Crops of the island of Barbados for the four years 1899 to 1902 inclusive.

Cost of Production, Etc Etc.		1899	1900	1901	1902
Sugar Crops of the island	Tons...	40,317	44,250	53,440	40,914*
Molasses Crops of the island	Puncheons...	29,134	37,234	46,043	42,191*
Cost of producing sugar on the average for ten years on 75 per cent. of the Plantations in Barbados†	Per ton...	£12 8 7	£12 8 7	£12 8 7	£12 8 7
Average price at which sugar sold ...	Per 100 lb...	£ 0 8 7½	£ 0 8 9½	£ 0 7 1	£ 0 4 5
Average price at which molasses sold ...	Per gal...	£ 0 0 6½	£ 0 0 8¼	£ 0 0 5¼	£ 0 0 3⅞
Value of 1 ton of sugar and 1 hogshead, less weighing and testing	...	£10 13 4	£10 17 0½	£ 8 18 9½	£ 5 19 0½
Value of 100 gallons of molasses and 1 puncheon, less guaging	...	£ 3 10 4	£ 4 4 11	£ 2 19 11	£ 2 8 5½
Average selling price of 1 ton of sugar and 100 gallons molasses, including hogshead and puncheon	...	£14 3 8	£15 1 11	£11 18 8½	£ 8 7 6
Gain per ton of sugar and 100 gallons of molasses	...	£ 1 15 1	£ 2 13 4	——	——
Loss per ton of sugar and 100 gallons of molasses	...	——	——	£ 0 9 10½	£ 4 1 1

* Sugar and molasses exported to July 31, 1902.

† The data were obtained from numerous estates situated in all the districts of the island. The cost includes the production of a ton of sugar and its 100 gallons of molasses, and also the value of the hogshead and puncheon.

Note—The average crop of sugar for the twenty years 1881 to 1900 inclusive was 50,688 tons.

EXPERT FOR RUM MANUFACTURE.

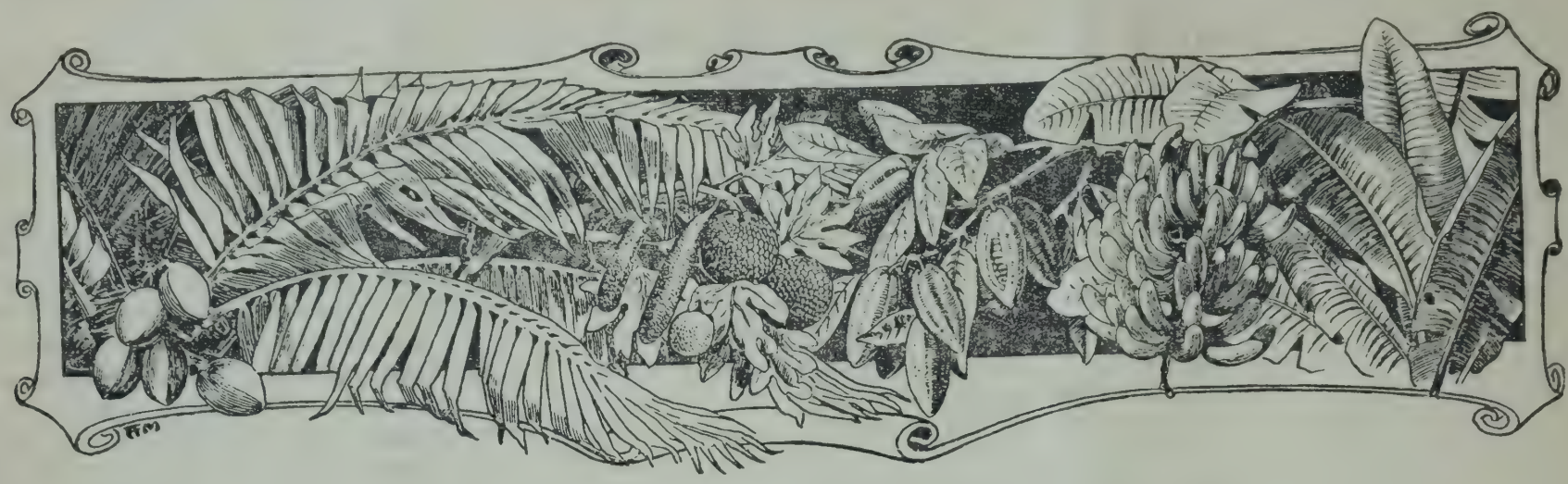
With reference to the proposal, on page 98 of the *Agricultural News*, for the employment of a specialist in Rum fermentation at Jamaica, the Hon'ble Emmanuel DuBoulay of St. Lucia writes :—

I was much struck by reading in the *Agricultural News* of July 19, kindly sent me, an account of a proposal made by Mr. Cousins, the Agricultural Chemist of Jamaica, that a Specialist should be appointed to investigate the present process of rum manufacture and to advise as to its improvement.

I think this an excellent move and one that could with advantage be adopted in the islands with which the Imperial Department of Agriculture has connexion. I am personally aware of how much good was done in Martinique in this direction, when the methods of rum manufacture, once crude and wasteful, were brought to a high state of efficiency by the advice and superintendence of Experts.

I hope the Department will be able to make some move in this matter. I am sure the services of such an expert would be warmly welcomed and would add one more factor of usefulness to the Department.

Coral Snakes: An article on the coral snakes of British Guiana appears in the *Argosy* for July 26, from the pen of Dr. R. Evans, the new Curator of the Museum at Georgetown. It appears that coral snakes may be non-venomous, slightly venomous or highly venomous according to the species. Unfortunately there are no distinctive popular names for the different species. There are three highly venomous snakes *(Elaps)*, two slightly venomous and two non-venomous. One of the latter *(Ilysia scytale)* which grows to nearly a yard in length 'on account of its beauty, perfectly harmless nature and for "cooling purposes" is sometimes worn by the Indians as a necklace.'



WEST INDIAN FRUIT.

STOCK FOR CITRUS FRUITS.

The following extract contains the conclusions arrived at by Mr. J. W. Mills, Foreman at one of the stations for experiments on citrus plants, attached to the University of California, as to the best stock for citrus plants. Mr. Mills' views are based on careful work extending over many years, including investigation into the root-systems of the plants experimented upon. The complete account of his work is to be found in Bulletin No. 138, of the University of California Experiment Station, entitled *Citrus Fruit Culture.* (Jan. 1902.)

The sweet orange ro t is a persistent surface feeder, having almost its entire root-system above a depth of 18 inches and rising to within 8 inches of the surface. This stock produces an abundance of fibrous roots that concentrate near the surface, just beneath the reach of the plough and cultivator, thus making the tree too susceptible to drought.

On the other hand, the root of the sour-orange penetrates to a depth of 9 feet or more, sometimes having numerous laterals near the surface, and sometimes having fewer but more sharply descending laterals. Both a deep root-system and broadly extending laterals, not too near the surface, are essential to the ideal stock. There would seem to be room for some selection among sour-stocks so as to obtain these qualities in the highest possible degree. Though the sour-stock does not appear to bring trees into full bearing as soon as do the sweet orange and the pomelo stocks, the value of the sour-stock in other directions may compensate for this defect, and it seems probable that in localities where the sweet stock fails, sour-stock will be used to a greater extent than now.

It has been shown that the lateral roots of the pomelo are found at a somewhat greater depth than the laterals of the sweet orange. The pomelo produces more fibrous roots than do either of the other stocks, and consequently the tree is a ravenous feeder. It is resistant, to a certain extent, to the form of gum disease that attacks the roots of citrus trees. On the whole the pomelo is deservedly becoming the favourite stock in Southern California. In practice it has succeeded better at the station than has the sour-stock, which seems to lack uniformity of root growth, sometimes having few laterals, in which case the crops are small. The pomelo seedlings have made the best growth in the nursery.

GRAPE CULTURE AT GRENADA.

A plant of the Muscat Hambro grape is thriving at the Ballast Ground, Grenada. It was introduced some four years ago along with other varieties from St. Vincent, and this year scores of bunches have been cut off leaving over 300 more to ripen. The Pied Carreau or Mocking Bird of Grenada unfortunately appreciates the grapes whilst yet green, and the bunches have had to be carefully 'bagged' very early in mosquito netting in order to protect them.

ST. LUCIA ARROWROOT.

A sample of arrowroot grown and prepared at the Rivière Dorée Experiment Station, St. Lucia, was forwarded to Messrs. Dalton & Young, London, for examination and report as to its merits and market value. The sample was obtained from plants of Bermuda arrowroot introduced into St. Lucia by the Department of Agriculture some months ago. The main point of interest was to learn how the St. Lucia product compared with the arrowroot exported from St. Vincent and other West Indian islands. Messrs. Dalton & Young report :—

In its dry state it is rather dull in colour, but it jellies nice and white, and is quite sweet in taste but it lacks strength, being much weaker than some of the well-known marks coming from St. Vincent, say for instance, the Owia. The recent volcanic eruptions in St. Vincent, and consequent destruction of some of the larger Arrowroot estates caused prices to rise rapidly, but subsequent large arrivals (about 4,000 barrels having taken place within the last few weeks) have caused considerable re-action to set in and quality, like your sample, which was worth a month or six weeks ago $4\frac{1}{2}d.$, we should not, to-day, value at more tham $2\frac{1}{4}d.$ to $2\frac{3}{8}d.$ per lb., and with any pressure on the part of owners to realize would in our opinion cause a further drop in prices. Previous to the eruptions the value of your sample would have been about $1\frac{3}{4}d.$ to $2d.$ Although the sample you send is grown from Bermuda root, it would not enhance the value on this market, as it would be shipped from St. Lucia and sold on its merits. We shall be pleased to give you any further information if you require it.

VANILLA.

Cultivation in the Seychelles.

(Concluded from page 117.)

CURING THE PODS FOR MARKET.

There are many different modes of preparing vanilla, but for brevity's sake one alone will be described; it is probably the simplest, and appears to be as successful as any other. About 400 of the longest pods are placed in a basket and plunged into hot water (190° F.) for ten seconds; this is repeated twice, the dips being increased to twelve and fifteen seconds respectively, with intervals of half a minute between each two. After the third dip, when most of the water has drained off, the pods are placed in a wooden box or barrel lined with blankets, and closely covered up with the same material. When lot 1 is finished, lot 2 is similarly treated, and for them the water may be a few degrees cooler, or the dipping times a trifle shortened; and so also with lot No. 3, while No. 4 may be treated as No. 2. Perhaps it is as well to add that 190° F. is not an absolutely essential heat, but it is about as high as it is safe to go; while even the longest pods may be adequately treated in water at 170° F. if they are kept in it long enough. An experienced preparer will be guided more by the appearance of the pod after each dip than by any fixed formula. When small quantities are dealt with less heat is needed, and the above figures are given for a boiler 22 inches in diameter by 12 inches deep. It is best to have good-sized boxes or barrels to sweat the pods in, those holding 2,000 or 3,000 each being preferable, for the more pods there are together the better heat is retained. The lots (1, 2, 3, and 4) should be kept apart, a fold of blanket being laid on each if all go into one box. By the following morning they should have changed to chocolate or puce colour, and are then ready to spread on the drying shelves; but if there is a large number together, and the heat has been well kept in, they may be left for another twenty-four hours.

A curing house for preparing a crop up to 2,000 pounds (dry) may have the following dimensions and fixings: 30 feet long, 15 feet broad, 13 feet in height of walls. It should be divided into four counterparts, two on the ground and two above, each being approximately 15 by 15 and 6½ feet high. One compartment on the ground floor is used as a hot room, having a flue 2 feet wide covered with sheet iron running through the centre. If the heat is too intense from this, sand may be sprinkled on top to reduce it. Above this flue and around two sides of the hot chamber tiers of shelves are fixed 6 inches apart, on which the pods are spread to dry. The shelves may be conveniently made of laths, on top of which mats or canvas can be laid, or fine-meshed wire netting would serve the same purpose, perhaps, better than anything else.... The worker, sitting on the floor, keeps the four lots of pods—long, medium, short, and split—distinct on the shelves. This facilitates the sorting, the short and split pods needing to be examined sooner and oftener than the longer and sound sorts, as they dry more rapidly.

A good average heat for the hot chamber is 110° F. A few degrees more or less does not matter, but pods are apt to dry too quickly if the heat is much greater. The slower the progress the more uniform and better is the result. As they begin to turn soft and show longitudinal wrinkles the pods are removed from room 1 to 3, and after reaching a certain degree of flexibility they pass on to the shelves in room 4 and there finish their curing. If kept too long in either a hot or warm room the thin ends of pods shrink too quickly, and this is to be avoided. In a large crop there are always some inferior, ill-nourished pods in which this occurs, but the last remark will be useful to a beginner. When fully cured the pods are much wrinkled and pliable, bending easily around one's finger. There is considerable difference in the degree of dryness preferred by different curers. If the contents move easily all along a pod, without any unevenness being noticed when it is drawn between the finger and thumb, it is nearly dry enough; but the right stage can only be learned by experience. When finished the pods are well wiped with bits of soft flannel and then kept in boxes with close fitting lids. It is better to sort them roughly into lengths as each day's lot is put away, and tie up the various sizes in bundles of about 200 each if the numbers allow of it, for they have to be examined once or twice a week in order to remove the moulded ones, and this is much more quickly done with bundles than when they are loose. Moreover, it makes the ultimate accurate measuring easier. Either at this time or later the different qualities are more exactly separated, none but faultless pods, without scar or defect in curing, being allowed in the first quality. The rest rank as seconds, etc. The split pods and the pods that have been cut on account of mould are also kept distinct. It is well to keep a crop at least three or four months before marketing. By that time nearly all shaky pods that are liable to mould will have shown themselves. All are then measured and tied up in neat bundles of 50 pods each of even length, the pods varying in length not more than one-eighth of an inch.

The general sightliness of a marketed crop has much influence on the price it will bring, and whatever whims buyers get into their heads the producer must conform to or suffer in pocket. Bundle tying is something of an art, and a deft hand at it is valuable. Sixteen or thereabouts of the shapliest pods in each 50 are selected for the outside; the rest are tied up as a core, being kept in position by a few turns of the fiber-tying cord, while the chosen sixteen are carefully placed round them. The bundle is tied in either three places, near each end and in the middle, or in two places, an inch or more from the ends, according to the length of bundle. The core-holding string is pulled out before the final tie is fixed. Two-tie packets are boxed as they are. With those of three ties buyers prefer that the end cords be removed before packing, to enable them to examine the bundles inside and see if the contents are of uniform quality. If kept tied some time before being packed the bundles set, as it were, and retain their neat shape. The tin boxes used here for packing vanilla in measure 12½ by 8½ inches in width, are 4½ inches deep, and hold about 12 pounds. Each box has a label pasted on it which bears the grower's trade mark, the length and number of packets, their quality, and net weight, and a similar label is put inside. As some chemical action is set up when vanilla rests in contact with tin or iron, thin vegetable parchment paper is placed in the boxes to keep the two apart. The lids are then sealed close with pasted paper and the tins packed in wooden cases, six in each, and thus dispatched to market.

Game Shooting at Barbuda.

The following notice appeared in the *Leeward Islands Gazette* of July 10, 1902:— 'Deer and other game shooting at Barbuda. Excellent shooting can be had at the above island during the months of July, August, and September. Applications for licences to shoot should be made to the Colonial Secretary at Antigua. For further particulars apply to O. Nugent, Esq., the Acting-Magistrate of Barbuda.'

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the **Commissioner, Imperial Department of Agriculture, Barbados.**

It is particularly requested that no letters be addressed to any member of the staff by name. Such a course may entail delay.

Communications should always be written on one side of the paper only. It should be understood that no contributions or specimens will, in any case, be returned.

All application for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on the last page of this number.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News

Vol. I. SATURDAY, AUGUST 16, 1902. No. 9.

NOTES AND COMMENTS.

Honey Production in Jamaica.

According to recent statistics Jamaica is probably, for its size, the most successful honey-producing country in the New World. The amount of honey produced, per square mile, in some of the leading countries and in Jamaica is as follows:—Texas, 18lb.; California, 31lb.; Cuba, 114lb.; Jamaica, 385lb.; The logwood honey of Jamaica compares very favourably with the alfalfa, sage and white-clover honey of the United States. A Jamaica Bee-keepers' Association has just been formed to assist bee-keepers and enable them to ship their produce to the best markets.

Surra Disease in Horses.

In a recently issued Emergency Report by the United States Department of Agriculture (Bureau of Animal Industry, *Bulletin No. 14, 1902*) an account is given of the Surra disease in horses in the Philippines. The disease is caused by a microscopic parasite *(Trypanosoma Evansi)* transmitted by biting flies, especially horse flies. It is a wet weather disease and *reported as invariably fatal to horses and mules.* If the disease were likely to be entirely confined to the Philippine Islands it would not be of immediate interest to the West Indies. We find, however, that although 'animals from the Philippines are now excluded in the United States, some animals were landed before it was known that surra existed in the Philippines.' There is a possibility, therefore, that this serious disease has already been introduced into the United States. The Report states: 'if once thoroughly introduced into the United States surra would cause a loss of millions of dollars.' The question arises whether, under the circumstances above related, and until it is shown that there is no surra in the United States, it would be safe for horses and mules from the United States to be landed in the West Indies. The risk is great, and considering the fatal character of this essentially tropical disease we are of opinion that, for the present, the several Governments in the West Indies (following the example of the United States Government with regard to horses from the Philippines) should absolutely prohibit the landing of American horses and mules in these islands.

Personal.

It is desirable to state that Mr. W. K. Morrison temporarily employed for a few weeks, as lecturer in bee-keeping, by the Imperial Department of Agriculture ceased to have any connexion with the Department since May 1901. Certain communications that have recently appeared in American and Canadian Journals from Mr. Morrison in which he makes it appear that he is still connected with the Department are not only misleading, but are regarded as calculated to misrepresent these colonies.

Onion Cultivation.

It is desirable to remind those who have ordered onion seed through the Department that the seed may arrive at any moment and everything should be in readiness to deal with it. In the first place the seed beds to receive the first sowing should be specially prepared with the soil well pulverized. It would be an advantage in most cases to sow the seed at intervals, say of a week, during August and September. The rows, across the beds, might be 6 inches apart. When the onions are 4 or 5 inches high, that is in about eight weeks after sowing, they are ready for transplanting into the field. Where the seed is to be sown, at once, in the open, the land requires to be well worked and the soil in fine condition. The drills may be about 15 inches apart. After the seed has been covered with about half an inch of well pulverized soil the whole may be gently patted down. Further particulars may be obtained from *Hints on Onion cultivation*, Pamphlet Series No. 16, obtainable from all Agents of the Department, price two-pence.

Bananas from Barbados.

In continuation of the experiment described on page 68 of the *Agricultural News*, Mr. J. R. Bovell, the Superintendent of the Botanic Station, Barbados, forwarded two more bunches of the Chinese or Dwarf banana, to England by the R.M.S. *Trent* on July 5. The bananas were packed in crates and put up exactly like those sent from the Canary Islands. Mr. Munro of Covent Garden writes: 'The bunches were in good condition and very well packed.... This variety suits our London trade better than the coarser ones from Jamaica if they come in good condition; and by the appearance of the fruit I think they will stand the

journey well as they seem to be firm and grown under drier conditions than the Canary fruit.'

This report is distinctly encouraging and when further data are to hand, figures will be published showing exactly the profits in each case.

Preserved Bananas.

At Jamaica where bananas are so extensively grown for exportation there are large numbers of bunches that are rejected and left on the hands of the growers because they are either too small, unripe or over-ripe, or otherwise unsuitable for shipment. It would lead to a valuable enterprise if means were devised for utilizing these bananas and saving them from being thrown away or fed to pigs. Many attempts have been made to manufacture banana meal, but there are so many attractive and popular competitors amongst cereals and starches that it is doubtful whether banana meal on account of its colour, its somewhat low nutritive value, and cost of production will, at any time, enter largely into consumption. Dried bananas have also been tried. They have been most carefully prepared at Jamaica, Montserrat and elsewhere. They have been packed in attractive boxes like figs and offered at a comparatively low price. So far efforts in this direction have invariably failed. In spite of discouragement in the past we are not without hope that means will, eventually, be devised to preserve waste bananas and present them in an attractive form for consumption in temperate countries. There can be no doubt, however, as to the popularity of bananas in the fresh state. The possibilities in this direction are unlimited if only the fruit is presented in really good condition.

Vanilla-Growing at Dominica.

Recently two interesting samples of well-cured vanilla pods were received from Dominica and forwarded to London for valuation and report by experts in Mincing Lane. By last mail Messrs. Brookes and Green write as follows:—

'As regards curing, the beans are in a satisfactory condition. The larger pods are in good condition and beginning to crystallize. They would realize here to-day 7*s.* per lb. (seven shillings per English pound) for the perfectly sound beans; some few are split at the ends and these are worth 4*s.* per lb. The second lot, viz., the shorter pods are not so good as the above, but are also, of fair quality and the sound beans would sell here to-day at4*s.* to 4*s.* 6*d.* per lb. and the split ends at 3*s.* per lb.'

As a first attempt to cure and prepare vanilla pods to compete with those produced by experienced planters at Seychelles, Bourbon and other countries the report is most encouraging. Messrs. Brookes and Green add useful hints in regard to sorting and tying up the beans. They also advise that, in place of tin-foil, parchment paper should be used to line the inside of the tins in which the pods are packed.

A series of articles have appeared in these pages (the last in this number) giving simple and practical hints for the cultivation of vanilla, fertilizing the flowers, and gathering and curing the pods. We commend these hints to the careful attention of all who are interested in vanilla production in these Colonies.

Volcanic Eruptions and Agriculture.

Mr. Hesketh H. Bell, the able Administrator of Dominica, deserves credit for his letter to *The Times* of July 22, drawing attention to the serious effects that the graphic accounts of the recent volcanic eruptions are likely to produce upon agricultural development in the West Indies. Those not well acquainted with these Colonies are apt to conclude that they are all within a short distance of each other, and that the recent eruptions threatened to destroy the whole of them. As a matter of fact, Jamaica is as far from Barbados as Gibraltar is from Plymouth, and Jamaica, British Guiana and Trinidad, all equally removed from the effects of volcanic agency, contain about nine-tenths of the total area of the West Indian Colonies. St. Vincent is the only British island that has suffered from an agricultural point of view, and it is hoped that Mr. Hesketh Bell's letter and the very conclusive leading article that appeared in *The Times* of July 23 will re-assure those who have interests in the West Indies that, with the single exception of St. Vincent, these Colonies have not been rendered less deserving than before of the notice of intending settlers or are less advantageous for the investment of capital. The cacao, lime and fruit industries are as flourishing as in any part of the world, and it is hoped when the full effects of the abolishment of bounties are realized, the sugar industry, also, will be more prosperous than unfortunately it is at present.

Plant Breeding Conference.

An International Plant-breeding and Hybridization Conference is proposed to be held at New York on September 30 and October 1 and 2 next. This Conference is receiving the active support of the United States Department of Agriculture, of the Department of Agriculture of the Dominion of Canada and practically of all the leading Botanical and Horticultural Societies in the New World. It is also being supported by the Royal Horticultural Society of London. It is proposed, as a matter of special interest, to include in the programme the results of work on hybridizing tropical crop-plants such as sugar-cane, bananas, maize or Indian corn, Cinchona and others. As it is evident that the Conference will prove of interest and value to the West Indies and bring forward subjects likely to bear directly on the important work in which the Imperial Department of Agriculture is engaged, such as raising new varieties of sugar-cane, Indian corn, sweet potatos, bananas, etc., the Secretary of State has approved of the support of the Department being given to it, and, if circumstances permit, a representative from the West Indies will attend the Conference.

WEST INDIAN FISHERIES.

Tarpon in Grenada.

We learn from the Rev. D. Silver that tarpon, known locally as 'Grand Ecaille,' exist in abundance in the lakes, rivers and seaboard of Grenada. In the dry season fish 5 feet in length are said to be picked up at Lake Levera (in the lagoons) in cart loads. People carry the fish away and preserve them in salt. The existence of tarpon in these lagoons is said to be unknown to persons other than those residing by the lake because firstly, the roots of the wild mangrove trees which grow in the lake render angling almost impossible, the fish making for these when hooked; and secondly, with the exception of one or two travelling English sportsmen, no one in the island is expert in baiting a hook or fishing with a rod. Tarpon also occur in Lake Antoine and along the coast near St. George's but are never caught because they are not fished for.

GUNGA IN THE WEST INDIES.

Under the heading of 'The Gunga curse in the West Indies,' a writer in the July number of *Chambers's Journal* gives a somewhat sensational account of the occurrence of the Gunga habit at Jamaica. What are known as Bhang and Gunga are the produce of the common hemp plant which, in temperate countries, yields the well-known 'hemp fibre' and the 'hemp seed' used for feeding caged birds. In the tropics the plant yields Bhang from the large leaves and Gunga from the dried flowering tops. Both are used for smoking by natives of India and possess a strong narcotic odour and taste. A third product, also used for smoking, is Charras, a gum resin collected from the growing plants in the field. The East Indian Coolies at British Guiana, Trinidad and Jamaica have brought with them the habit of smoking Gunga. In extreme cases it is admitted the habit leads to injury to health, to fits of intoxication, and sometimes temporary insanity. One hears very little however of these ill effects in either of the Colonies named. It is true that, with the view of discouraging the use of Gunga amongst Coolies, the Government of Trinidad, some time ago, prohibited hemp being grown in the Colony and an import duty of 15*s.* per lb. was imposed on the dried drug. Whether the Gunga habit in Jamaica has of late assumed serious proportions is open to doubt. In any case the sensational article above referred to does not apply generally to the West Indies, and its effect is likely to give rise to misapprehension and mislead those interested in these Colonies.

TRINIDAD TRADE.

We are indebted to Professor Carmody for a Pamphlet with Statistics of Trinidad Trade compiled by him in behalf of the Agricultural Society for distribution at the Toronto Exhibition. This should prove useful in making known the resources of the Colony and also in attracting the attention of merchants and shippers in Canada to openings for Dominion products. The principal exports of Trinidad are sugar and its by-products, cacao, asphalt, cocoa-nuts and cocoa-nut oil. The average annual value exported during the five years ending 1900 was as follows:—Sugar £620,000 ; cacao, £664,000 ; asphalt, £137,000. It is stated that the sugar exports have in 25 years decreased in value by 25 per cent., while the cacao exports have increased 100 per cent., and asphalt 500 per cent. The Colony is peculiarly suited for the production, in very large quantities, of starches, fibres, fruits, spices, tobacco, kola nuts, castor seeds, dyes, rubber, and ornamental palms, etc. It is added that as the agricultural advantages of Trinidad are confined to a very limited number of tropical products, it is dependent upon other countries for many substances that could, readily, be produced locally. Amongst these are cereals, cattle foods, dairy products, preserved meat and fish, cattle and sheep, fuel, etc. Amongst manufactured goods there is a demand for building material, furniture, textiles hardware and machinery, boots and shoes, soap, malt liquor, whisky, brandy and wines.

THE GROUND-NUT INDUSTRY OF BARBADOS.

The Ground-nut, known also by a variety of other names, such as earth-nut, pea-nut, monkey-nut, pindar, and *pistache* (Fr.) is cultivated on a small scale in Barbados and in other localities in the West Indies. The so-called nut is the fruit of the plant, *Arachis hypogaea*, a member of the Pea or Leguminous order. The general characters of its foliage, flowers, and fruit are sufficiently well indicated in the accompanying figure.

CULTIVATION.

A light soil is the most suitable, and the presence of lime would appear to be essential. No special treatment is necessary. The soil is tilled to a depth of 6 inches, manured if necessary, and the seeds sown at the onset of the rainy season, usually about June in Barbados. The nuts are shelled before planting and the seeds sown about 18 inches apart, and 3 inches deep. The variety at present grown takes some six months to ripen. In normal years therefore the crop is harvested about November to January. The vines are dug up and the nuts picked off by hand, a laborious proceeding owing to the fact that the nuts occur all along the trailing branches. The average yield per acre seems to be about 2,000lb. rising sometimes to 4,000lb.

The Department of Agriculture has recently imported seeds of an American variety which only takes about three months to ripen and which bears its fruits more on the main stem. These have been

given away to various cultivators to test its suitability for local conditions.

LOCAL USES.

The nuts are eaten either fresh or parched, used in the preparation of nut cakes, and sometimes employed to make a 'cocoa.' Their most important value in other countries as a source of oil is not taken advantage of.

VALUATION IN ENGLAND.

In order to ascertain their value for dessert purposes in the London market the Imperial Department of Agriculture forwarded two small consignments for report as to their merits and market price. The samples sent consisted of nuts of last year's crop, selected for size and general appearance. Messrs. Leete, Son & Co., Liverpool, reported on their sample in the following terms:—

'Having examined the sample of ground-nuts, we are of opinion that same are very fine in size, and would be saleable in considerable quantities for eating purposes at a value of about £16 10*s.* to £17 per ton, if the outside shell could be kept clean and bright, (this is important, as people buying for dessert purposes require a nice appearance) also the nuts should be dry when shipped, as we find that inside the shell the kernels are inclined to be mouldy in the sample.

'Should it be impossible to obtain the nuts in any better conditions than the sample shows, they would only be fit for crushing purposes, and the value would only be from £10 to £11 per ton, but no doubt large quantities could be sold for this purpose.

'This year there is a partial failure in the Senegal ground nut crop, while India (East) has produced a considerably larger crop than usual.'

Messrs. James Philip & Co., to whom the second sample was sent, reported as follows:—

'With reference to the ground-nuts we shall be happy to try and sell any you may send over, but the brokers say they ought to be cleaner looking. Much better specimens come from the States and elsewhere, and they will fetch about £3 or £4 a ton more *without* the shells. At present they are worth about £9 to £12 a ton here, perhaps more, but like everything else it is all a question of supply and demand.'

Fig. 13. The Ground Nut. (Arachis hypogaea.)
(From the Dictionary of Gardening.)

POSSIBLE EXPORT TRADE.

There is thus a possible opening for an export trade in ground-nuts for dessert purposes. But as will be seen from the reports, it is essential that the nuts are perfectly dry and of good colour and appearance. These desiderata can be obtained by growing the crop on light calcareous soil, harvesting the nuts carefully, washing if necessary and thoroughly drying them before export.

VALUE OF THE OIL AND OIL CAKE.

Of probably more value, even, to Barbados are the local uses to which they might be put. Ground-nut oil is one of the best oils. Its good qualities are perhaps best summed up by saying that ground-nut oil is the most common adulterant of olive oil, and the most difficult to recognize. It could be employed as a substitute in many cases for cotton seed, and cocoanut oil in these Colonies. The potential value of the plant to Barbados alone, which in 1900 imported over £8,000 worth of cotton seed oil, and £4,000 worth of other oils is very considerable. After the oil has been expressed an oil cake is left which has been experimented with in England, India, and elsewhere as food for stock, etc. Chemical analyses show it to contain roughly speaking 50 per cent. of nitrogenous matter, 25 per cent. to 30 per cent. of carbohydrates, and about 8 per cent. of fat. 'It is one of the most concentrated feeding stuffs with which we are familiar, ranking with cotton seed meal, linseed meal, etc., and in some cases ahead of them.' (U.S.A. Department of Agriculture, *Farmer's Bulletin*, No. 25, p. 6.)

That there is room for the local production of such a material in Barbados is indicated by the fact that in 1900 oil-cake and oil-meal were imported to the value of over £15,000. Oil-meal and oil-cake are in great demand on estates and it remains to be seen whether it may not be possible to satisfy part, if not all the demand, by locally grown produce.

POULTRY.

(*Continued from page 122.*)

BREEDS OF FOWLS.

It will thus be seen that the raising of poultry is an industry of very great importance in agricultural countries. Although the West Indies may have no export of eggs and fowls, an industry producing an annual value of over £500,000 in one island is one that deserves some study, and while we are seeking for knowledge and applying it in the breeding of cattle and horses and in the improvement of our cultivated plants, we ought not to overlook the utility of poultry. Besides, poultry-rearing is especially suitable as a cottage industry and can be engaged in by almost everybody in the country. If we put the average number of eggs laid by each hen in the West Indies, under present conditions, at fifty per year as I have done in my figures,—I am sure that number is a fair estimate,—and if, by better knowledge of different breeds of fowls, a more intimate knowledge concerning their breeding feeding, and housing, we can make the average number of eggs laid by individual hens to be a hundred, which is no great figure in comparison with the average of many flocks of hens in the United States and Great Britian, this alone would mean an increase of value of over £300,000 to Jamacia, and a proportionate increase to other islands.

Whatever we do should be done creditably. Good fowls take no more food than bad ones : the latter we find generally the greatest eaters, indeed, but they put their food in an ill skin. Therefore I shall write about the breeds found most suitable in Jamaica, which island is a composite one, so far as climate and weather are concerned, and the conditions found therein will include everything to be found elsewhere in the West Indies.

First, let me explain, that here, as in other lands, there are two distinct classes of poultry keepers : the fancy, and the utility men—the first, keeping fancy breeds only as a hobby to please their eye and to take prizes at shows perhaps ; the second, keeping fowls for usefulness alone, not caring so much about their fine feathers, if they get plenty of eggs. Both have pleasure and profit ; if we keep them for profit and get it, we have pleasure: if we keep them for pleasure and get it, we have profit. But I am dealing strictly on the utility and profit side of poultry as represented by cash saved or cash gained.

CLASSES OF HENS.

Hens are roughly divided into three classes : the laying breeds, the table breeds, and the all-round breeds. The last are principally latter-day productions made by crossing the originally distinct laying and table breeds and making new breeds. The table birds are large and fleshy and, with the exception of the Dorking, an old English breed, they hailed originally from Asia (principally China) and are therefore sometimes called Asiatic breeds. They are all feathered on the leg except the Game classes, and the principal are the Brahma, the Cochin and the Langshan. The first two are now bred very heavily feathered on the legs and are thickly feathered and fluffy on the body. They are thus excellently adapted to stand cold and are just as ill adapted to stand heat, and hence they have never thrived well in Jamaica, having the worst record of deaths on the voyage here and shortly after arrival of any breeds. The Langshan, on the other hand, is more lightly feathered, and is the only breed of the large Asiatic class that is in any way suited for the West Indies. Yet it is more of a cold-country type ; but it is excellent for crossing, as will be afterwards explained. The Cochin is usually a poor layer of small, brown eggs, and is kept mostly for crossing for size, and for its beautiful buff colour. It is an entirely useless breed for the West Indies. The Brahma is a fair layer of good-sized, brown eggs. All three take long to mature and are not ready to lay until they are nine months old. They are hot sitters, getting broody readily, yet they do not make good mothers owing to their clumsiness.

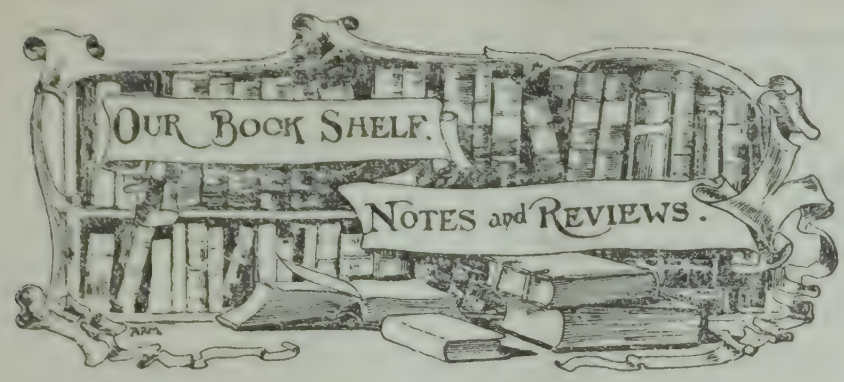
GAME FOWLS.

None of these three breeds can be selected as utility fowls for Jamaica, but the cocks are sometimes useful for crossing for size when that is desired. The Game breed, most in vogue for usefulness, is what is called the Indian-Game, Cornish Indian-Game, (a latter-day production of the County of Cornwall, England,) and is not in any way to be confounded with the Pit Game or Fighting Game. This Cornish Indian-Game is a favourite fowl among penkeepers in Jamaica, and is much more suitable for the climate than the feathered-legged breeds. It is large and very solidly built, very close feathered, and thus never looks as heavy as it really is. It is purely a table fowl, and as such is surpassed only by the Dorking. The hens, exceedingly poor layers, are strong sitters and make good mothers. The Old English Game is also a splendid table fowl, not so large as the Cornish ; but the hens are better layers. They are not of great use when kept pure, owing to their pugnacity and the small size of the hens, but for crossing with good, large, fair-laying hens of any type, they give activity, hardiness (either against heat, cold, or damp) and food-seeking propensities to the crosses, so that this is altogether an excellent fowl to breed from, where many enemies to chickens are common, for the hens make wary, careful, tender, mothers, and the cocks are thorough gentlemen in looking well after their mates.

DORKINGS.

The Dorkings as table fowls are unsurpassed. They have short, white, or pink legs, deep bodies, full breasts, small bones, white flesh, and would be suitable for dry localities in the West Indies where there is plenty of shade. The hens are rather poor layers of white eggs, of fine size, and are strong sitters. The table fowl that generally takes the prizes at the great stock shows in England, is a cross between the Dorking and Indian or Old English Game. The Dorking is the modern type of the old barn door fowl. It is an old English breed which ' came over' indeed before the Normans, for it is supposed to have been first introduced by the Romans, and was always a well-known type, through its having five toes on each foot. It has not been very successfully keptin Jamaica. *(John Barclay.)*

(To be continued.)



LECTURES ON SOME OF THE PHYSICAL PROPERTIES OF SOIL. By Professor R. Warrington, F.R.S. Clarendon Press, Oxford, 1900.

The volume deals with the physical properties of soil and their bearing on crop production, a branch of Agricultural investigations which has been greatly neglected by English workers but has attracted a considerable amount of attention in the United States and Germany. In the former country, a special branch of the Department of Agriculture is maintained to conduct inquiries in this field. That the failure on the part of investigators in England to appreciate the importance of the physical properties of the soil has done much to maintain the divorce between practice and science in the minds of agriculturists in that country is plainly stated by the author as follows :—

'There can be no doubt that the neglect of the physical conditions of the soil as a subject of study, and in consequence, as a subject of teaching, has done much to hinder the appreciation of science by practical men. The experienced farmer knows the overwhelming importance of a proper texture of the soil for the profitable culture of each crop. His scientific teacher has, however, little to say on this subject, while he freely recommends the use of expensive manures which a proper culture of the soil might render unnecessary, and which must fail to yield a profitable return if a favourable physical condition of the soil is absent. The farmer feels that this teaching is out of touch with the experience he has gained on the farm; he also frequently finds that the plan suggested is not a financial success. He therefore characterises the advice given as "theoretical," and concludes that science is not a safe guide to the farmer.'

As the author points out in the preface, it is only on the results of experimental investigations that agricultural science can be safely built. Any general principles underlying soil constitution must therefore be deduced from a careful study of accurate and long continued experiments. Proceeding in this way the author has condensed the vast masses of results accumulated by King and other workers in the United States, by many investigations in Germany and those obtained at Rothamsted, which bear on the subject, into the volume before us. The result is, as would be expected from the distinguished author, a masterly treatise which should find a place in every agricultural library.

While parts of the work deal with matters and conditions which are foreign to West Indian experience, the greater portion will prove of great interest to all connected with field experiments in these Colonies. Especially useful are the earlier chapters dealing with the physical constitution of the soil, mechanical analysis of soil, the production of tilth, the relation of the plant to water and the amelioration of the physical properties of the soil.

SCHOOL GARDENS.

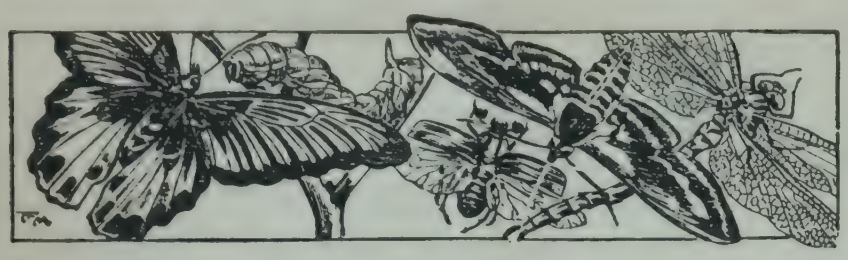
The *Church Weekly* for March 27, contains an interesting article on School gardening. We reproduce the greater portion :—

'There is nothing new under the sun,' said the Wise Man, and every day we prove the truth of the assertion, and learn that our most wonderful discoveries are but the reproduction of some made in what we are pleased to term the 'Dark Ages.' Three hundred years ago there was a Marconi, and about the same time Comenius was urging that 'a garden be connected with every school where children can gaze on trees, flowers and herbs, and be taught to enjoy them.' Francke, in 1695, established a garden in connexion with his school for orphans. But it was Rousseau, in 1762, who fully developed the idea of garden work as a part of real education in his 'Emile.'

The school garden suggested by Austria was rapidly taken up throughout Europe. In 1869 the Austrian imperial law prescribed that, where practicable, a garden and a place for agricultural experiments should be established in connexion with every rural school.

There are at present in Austro-Hungary 18,000 such gardens. The Federal Government of Switzerland appropriates money annually for their establishment. In France since 1887 no plan of a school building is accepted without an adequate garden attachment. In Belgium each school must have a garden of at least 39½ square rods. Vegetable culture must be taught, and fitness for this speciality is made to determine the acceptance of teachers. In 1876 Sweden had 1,600 school gardens, and now she has over four thousand. In Southern Russia are found school gardens in which are cultivated, by the children, grapes, berries, vegetables, grain, together with silkworms and bees. There are twelve thousand fruit trees in such gardens, and to bring them to their proper condition is as much a part of the pupil's work as lessons in mathematics. Germany has in some respects gone even further; for not only with the real-schools and gymnasia are there gardens, but the normal schools are provided each with a few acres of land, where teachers get their training in the industries.

In England the movement has been sporadic. A recent letter in *The Times* recounts a private enterprise, where each boy has a plot of land, 30 feet by 10 feet, for individual experiment—besides the work he must do in the larger garden connected with the school. Instruction is given in soils, in vegetable botany, in manures, in growing plants, flowers and vegetables. The pupils are required to take notes, and all their private investigations are under review by the teachers, and their inquiries are carefully answered. From their personal plots they may sell whatever fruits or vegetables or flowers they are able to raise. The results of this sort of education are not immediately apparent. But it is a universal comment that there is a very speedy result in the way of an impulse to improve home grounds. The school garden or gardens stand as object-lessons to the whole country about. Not only the pupils themselves, but their parents, have their ambition awakened to have their homes surrounded with the beautiful as well as the useful. In some parts of England the county councils are doing the work—appointing instructors who are practical gardeners. It is reported that upwards of 40,000 crops have been grown since 1892, and subjected to rigid examination and valuation. It is noted also that great gain has been made in the cash value of the work accomplished by the pupils.



INSECT NOTES.

Uses of Carbon Bisulphide.

This liquid has been recommended for the destruction of weevils in grain, *(General Treatment of Insect Pests.* Pamphlet 5, Department Series) and has many uses in agriculture. Up to the present it does not appear to have been generally tried in the West Indies. It is used in Grenada as a means of freeing nutmegs from weevils, and in Trinidad against ants and for pests of grain, seed, etc.; but as an insecticide it is by no means so generally familiar as it should be.

The United States Department of Agriculture has recently issued a bulletin on *Carbon Bisulphide as an Insecticide, (Farmers' Bulletin,* No. 145, by W. E. Hinds,) which should be in the hands of all who contemplate employing this valuable substance. The bulletin describes the properties of the liquid and its vapour with the effects it produces on human beings if inhaled. Evidently carbon bisulphide can be confidently recommended as a general insecticide and can be handled with perfect safety if the user is familiar with the properties of the liquid and its vapour.

Carbon bisulphide is said to cost from 35 cents per pound retail to 10 cents or less a pound if bought in 50lb. cans or drums. Its uses in agriculture in America and Europe appear to have been very varied. It has a special value against underground pests, such as the *Phylloxera* of grape vines: the liquid injected into the soil vapourises, and the vapour while proving fatal to the insect does not remain long enough in the ground to prove injurious to the plants. Whether there are any root-infesting insects in these islands against which carbon bisulphide could be used is doubtful; none have yet been found sufficiently destructive to warrant the recommendation of this remedy. The liquid has also been used against root maggots and ants. The latter are often a source of trouble here, and were carbon bisulphide obtainable, it would frequently be used to destroy ants' nests. The many household ants which have nests outside can be readily destroyed by pouring the liquid into the nest and plugging it up with clay. This is the simplest method of ridding a house of these ants.

Carbon bisulphide is also recommended against mole crickets, one ounce being injected into the soil in three or four injections for every square yard. Whether this method would prove successful in St. Vincent and St. Lucia is not certain, but it is at least worth a trial.

Another use is found in destroying borers in trees. In the case of large borers it should give good results, the liquid being injected into the burrow by means of a spring-bottomed oil can, and the burrow then sealed with wax or damp clay.

In the case of plant lice and similar pests, on melon vines and low growing plants, the carbon bisulphide is used by covering the plant with a small tight box and then introducing one or two teaspoonfuls of the liquid, either through a hole at the top or by placing it in a saucer under the box.

All of these methods are applicable in the West Indies. But this liquid should especially be used for treating stored products such as Indian corn, guinea corn, etc. It has a great use for this purpose in the United States, and is constantly employed to fumigate buildings. There is at present a great scope for this insecticide against pests that destroy corn, seeds, cacao beans, nutmegs, flour, groceries and household articles. Its use is simple and the treatment is cheap. The odour is somewhat unpleasant, but the vapour will entirely disappear after a short exposure to the air.

The above bulletin contains much information that cannot be summarized here. It gives full information as to the uses of carbon bisulphide, and any one who reads it will readily appreciate the value such an insecticide has in the treatment of many agricultural and household pests. It is to be hoped that planters and merchants may see the applicability of it and test it. Until there is some demand for it, it cannot be imported in large quantities and so is not as cheap as it should be; but even at the retail price in the West Indies (48 cents), it would prove a cheap way of fighting many pests.

Preserving Books.

In the tropics books are often seriously damaged by cockroaches, moths and other insects. As a means of preserving them from the attacks of these pests, the covers of books *both inside and outside* should always be slightly painted over with the following mixture, put on with a brush:—

1 oz. corrosive sublimate
1 oz. carbolic acid
2 pints methylated or rum spirit.

This solution does no damage to the books, and has been proved by many years' test to be an efficient protection. Books should be repainted with the solution every two or three years.

The solution must not be put into a metal plate or dish, unless it is enamelled. An ordinary saucer is the best.

The solution is poisonous and should be kept away from children or animals. After it has dried the books may be handled without any risk of danger.

An Attic Full of Honey.

An extraordinary discovery of honey has been made. It was found in the roof of Strawberry Hall, at Tydd St. Mary. Two swarms of bees have hived there for 16 years, and the proprietor has many times offered the honey to any one who would shift the bees and make the roof good again. This task has been at last accomplished by a builder, who obtained 280 lb. of honey as his guerdon.

TOBAGO: REPORT ON THE BOTANIC STATION, 1901-2. By Mr. H. Millen, Curator.

The Imperial Grant-in-aid of this station (£500) was supplemented by the Government of Trinidad to the extent of £150 for establishing this new station, and a house was built on the station for the Curator at a cost of £400. The amount realized by the sale of plants, etc.. was £35 showing an increase of £15 on the proceeds of sales for the previous fifteen months. Experiments with economic plants such as vanilla, rubber plants, cardamoms, cacao, new varieties of coffee, yams, cassava, tannias, sweet potatos, fibre plants, spices, seedling sugar-canes and tobacco have been carried on. The most promising food plants have been regularly distributed to settlers and by these means their resources have been greatly increased. The experiment in onion growing, from seed supplied by this Department, was distinctly promising and deserves to be repeated on a larger scale. On an outlay of 12*s* 4¼*d*. the net profits were 8*s* 8½*d*. The value of the onions imported into Trinidad during five years was as follows:—1895, £7,537; 1896, £4,905; 1897, £10,583; 1898, £7,857; 1899, £10,431. The total value of the imports for five years 1895–1899 was £41,313. It is evident that if onions could be grown at Tobago to supply, even a portion, of the requirements of Trinidad, a considerable industry might be established in the former island. The results of the expenditure of the Agricultural Grant-in-aid at Tobago are fully satisfactory, and Mr. Hart, the Superintendent, the Curator and the Agricultural Instructor deserve credit for the valuable services rendered in carrying out the several duties entrusted to them.

ST. KITTS-NEVIS: REPORT ON THE BOTANIC STATION, 1901-2. By Mr. W. Lunt, Curator.

The Curator reports steady progress in the efforts to improve agricultural conditions in the Presidency. The sugar industry has, necessarily, taken the greatest share of attention. A popular summary of the results of the experiments made in this direction during 1901 have already appeared in No. 12 of the Phamphlet Series of the Department. The detailed results are to be found in the *Reports on Sugar-cane Experiments in the Leeward Islands*: Part I. 'Experiments with varieties of Sugar-cane' and Part II. 'Manurial Experiments,' consisting of 32 and 78 foolscap pages respectively. The importance of other cultivations has not been lost sight of and experiments in tobacco, onions, English potatos, were carried out. The teachers have received a course of lectures in the principles of Agriculture, and practical work is being carried on by school children on plots in the Botanic Station.

A half-bred Maltese Jack, three boars, and two rams have been introduced by the Imperial Department of Agriculture in order to improve the breeds of stock at St. Kitts and Nevis.

PORTO RICO.

TOBACCO, COFFEE, FRUIT, RICE AND COTTON.

We have elsewhere drawn attention to the prospects of Sugar in Porto Rico for the coming season. The following extracts from the Consular Report (p. 115) on *The Trade of Porto Rico* for 1901, are of much interest to those engaged in similar cultivations in the British West Indies:—

Tobacco—Great attention is now being paid to the future, and serious plans are under consideration for the entire control of Porto Rican tobacco interests by the Tobacco Trusts.

The year's crop is said to have been about some 30,000 cwts. and to have fetched from $5.00 to $6.00 per cwt. but from the demand created it will certainly bring much more in 1902.

Coffee—Coffee for the year did better than was forecasted, producing some 27,000 bags to last year's 12,000 or 14,300 bags. When, however, this yield is contrasted with that of the year before the hurricane, which so effectually devastated the plantations, viz., 225,000 bags, it will be seen how much more there is to pick up to recover the normal output which was estimated to be worth at least £2,000,000.

The island very naturally feels keenly any depreciation of its coffee industry, for unlike that of sugar, the bulk of the production money remains on the spot with the workers.

Free trade with the United States more than compensating for the loss of Porto Rico's former markets, the present extent of planting is sure to be improved upon, although, strange to say, while hearing a great deal of the absorption of sugar and tobacco by the great Trusts, no such fate, appears as yet, to have been prescribed for coffee.

Oranges.—The prospects of orange growing are encouraging, but considerable time must elapse before sufficient experience is attained by the island planters to place the trade on a business footing. The capital required is not large, but as at least five years must be passed without remuneration, it is not an attractive speculation for limited capitalists.

It is claimed that Porto Rico, when all conveniences shall be established, will be able to get its orange crop to market at a time when it will be free from competition and thus reap a great advantage. This, however, remains to be proved by practice.

During the year considerable quantities of oranges were shipped to the United States from the western port of Mayaguez, but the business is said not to have been very brilliant though satisfactory in a sense, owing to the crude methods of handling and packing the fruit as well as the too grand expectations of the growers.

Pine-apples.—Pine cultivation is increasing in favour, all conditions of the situation appearing to be favourable to their growth, and there is a steady demand for them. However, before the trade in fruit of any kind can arrive at any remarkable growth of importance, quick and regular transport, both on land and sea, must be organized.

Rice.—Although a good quantity of rice is raised on the island, entirely for home consumption, it is estimated that all the country can produce must be augmented by at least 20,000 tons of imported grain per annum.

Cotton.—During the year attention has been directed to the possible cultivation of cotton, based upon its former production on the island in 1869, during the time of the Civil War, when a very fine quality is said to have been raised. There is ample land lying idle fit for the growth of cotton to be bought for about $25 per acre.

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is desirable that inquiry be made, beforehand, as to the terms on which such produce will be received, and whether the market is favourable or not.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—July 22, 1902.—Messrs. J. Hales Caird & Co., Messrs. Gillespie Bros. & Co. and The Public Ledger, July 19, 1902.

Aloes—Barbados 13/- to 35/-; Socotrine 70/- to 80/- per cwt.
Arrowroot—St. Vincent, good to fine $2\frac{3}{4}d$ to $4d$ per lb.
Balata—$2/4\frac{1}{2}$ per lb.
Bees-wax—Jamaica, good to fine £7 17*s* 6*d* to £8. 2. 6. per cwt.
Cacao—Trinidad, middling to good red 64/- to 67/-; fine 72/- per cwt.
Grenada, good reddish 58/- to 60/-; fair to fine 61/- to 64/6 per cwt.
Jamaica, good to fine 60/- to 63/- per cwt.
Cardamoms—Mysore, 1/- to 3/- per lb.
Cassia Fistula—5/6 to 35/- per cwt.
Castor Oil—$4\frac{1}{2}d$ to $4\frac{3}{4}d$ per lb.
Coffee—Jamaica, small greyish 38/- to 44/6; bold coloury @ 73/- per cwt.
Costa Rica, 40/- to 78/- per cwt.
Peaberry, 43/6 to 62/6 per cwt.
Cotton—Carriacou, $4\frac{7}{8}d$. per lb.
Cotton Seed—£7. 1. 3. per ton ex ship.
Cowage—1*d* to 2*d* per lb.
Fustic—Jamaica, quiet.
Ginger—Jamaica, fair bright 44/- to 53/-; good common 34/6 to 36/6 per cwt.
Honey—Pale brownish 17/- to 18/6; clear amber 17/6; dark 14/6 per cwt.
Jalap—4*d* to 6*d* per lb.
Khus-Khus Root—12/- per cwt.
Kola Nuts—1*d* to 4*d* per lb.
Lime Juice—Raw, 1/3 per gallon; concentrated, £12. 5*s*. to £12. 10/- per pipe.
Logwood—Jamaica, quiet.
Mace—1/- to 2/6 per lb.
Nitrate of Soda—Agricultural £8. 17*s*. 6*d* per ton
Nutmegs—140's to 80's, $6\frac{1}{2}$ to 1/3*d*; 60's to 2/4; in shell 4*d* to $5\frac{1}{2}d$ per lb.
Oil of Limes—no quotations.
Pimento—$2\frac{3}{4}d$. per lb.
Sarsaparilla—10*d* to 1/2*d* per lb.
Sugar—Muscovado 9/9 to 14/6; crystallized $12/10\frac{1}{2}$ to 13/9 per cwt.
Sulphate of Ammonia—Grey, 24 per cent., London £12. 10*s* per ton.
Tamarinds—Barbados 13/-; Antigua 12/- per cwt.
Tonquin Beans—9*d* to 2/6*d* per lb.
Fruit—Covent Garden Market (Gardeners' Chronicle, July 19, 1902.)
Bananas—8/- to 12/- per bunch.
Lemons—18/- to 25/- per case.
Mangos—2/- to 4/- per dozen.
Oranges—20/- to 35/- per case.
Pines—2/- to 4/- each.

New York,—July 11, 1902.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaica, 9 hands $1.05, 8 hands 70c.. 7 hands 40c. to 45c. per bunch.
Cacao—African $12\frac{3}{4}$c. to 13c.; Caracas, fair to good ordinary 14c. to $14\frac{1}{2}$c.; Jamaica, good $10\frac{7}{8}$c.; good fermented $11\frac{7}{8}$c.
Grenada $13\frac{1}{4}$c. to $13\frac{1}{2}$c. Trinidad 13c. to 14c. per lb.
Cocoa-nuts; Small Trinidads $12.00 per M.
Coffee—Rio, good ordinary 5c to $5\frac{1}{8}$c.; Jamaica good ordinary 6c. to 7c. per lb.; Manchesters 8c. to $10\frac{1}{2}$c,
Ginger—8c. to $8\frac{3}{8}$c per lb.
Pimento—$5\frac{1}{4}$c. per lb.
Rubber—Nicaragua Scrap 50c. to $50\frac{1}{2}$c. per lb; sheet 44c. to 45c. per lb.; Guayaquil Strip 47c. to 48c. per lb.
Sugar—Muscovado, 89°, $2\frac{5}{8}$c.; centrifugals, 96°, $3\frac{3}{8}$ per lb.

INTER-COLONIAL MARKETS.

Antigua,—July 30, 1902.—Messrs. G. W. Bennett, Bryson & Co., Ltd.

Molasses—9c. per gallon, package included.
Sugar—Muscovado $1.10 per 100lb., nominal.

Barbados,—Aug. 2, 1902.—Messrs. T.S. Garraway & Co.

Arrowroot—good quality, $3.50 per cwt.
Cacao—$13.50 per cwt.
Coffee—Jamaica and ordinary Rio $9.00 and $9.50, respectively.
Hay—lotting $1.00 per 100lb.
Manures—Nitrate of Soda $60.00 per ton. Sulphate of Ammonia—$75.00 per ton.
Molasses—8c. per gallon and $4.00 for package.
Onions—Madeira $3.75 per 100 lb.
Potatos—$3.00 per barrel.
Rice—Ballam $4.90 per bag; Patna $3.75 per bag.
Shalots—12c. to 14c per lb.
Sugar—in hogsheads, $1.00 per 100lb. and $5.00 for hogshead; in bags $1.20 per 100lb.

British Guiana,—July 31, 1902.—Messrs. Weiting & Richter.

Arrowroot—$8.00 per barrel.
Cacao—native 11c. to 12c. nominal.
Cassava Starch—$6.00 per barrel.
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica 11c. to 12c. per lb. (retail.) Creole, 11c. to 12c. per lb.
Eddoes—$1.20 per 100lb.
Onions—sold out at 4c. per lb.
Pea Nuts—Curacoa $3\frac{1}{2}$c. to $3\frac{3}{4}$c. American $4\frac{1}{2}$c. (retail.)
Plantains—20c. to 48c. per bunch.
Potatos English—$4.50 per barrel.
Rice—Ballam $4.80, to $4.90; Patna $5.90 to $6.00 per bag—Creole Rice 20c. per gallon, (retail.)
Sweet Potatos—Barbados $1.32 per 100lb.
Tannias—$1.56 per 100lb.
Yams—$3.00 per 100lb.
Molasses—Vacuum Pan yellow $14\frac{1}{2}$c. to 15c. per gallon, casks included.
Sugar—Dark Crystals $1.60; yellow $2.10 per cwt.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—July 30 & Aug. 1, 1902.—Messrs. Gordon Grant & Co. and Messrs. Edgar Tripp & Co.

Cacao—Ordinary $12.90 to $13.00; estates $13.25 to $13.50 per cwt.
Balata—no quotations.
Coffee—Venezuelan. Ordinary $7\frac{1}{4}$c. per lb.
Onions—$2.25 to $2.50 per 100lb.
Potatos English—$2.50 to $2.60 per 100lb.
Rice—Yellow $4.50 to $4.75; White Table $5.25 to $5.75 per bag.
Sugar—For Grocery use, $1.70 to $3.00 per 100lb.
Molasses—No quotation.

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London: Messrs. Dulau & Co., 37, Soho Square, W. *Barbados:* Messrs. Bowen & Sons, Bridgetown. *Jamaica:* The Educational Supply Company, 16, King St., Kingston. *British Guiana:* The 'Daily Chronicle Office, Georgetown. *Trinidad:* Messrs. Munro, & Co., Frederick St, Port-of-Spain. *Tobago:* Mr. C. L. Plagemann, Scarborough. *Grenada:* Messrs. F. Marrast & Co., 'The Stores,' St. George. *St. Vincent:* Mr. W. C. D. Proudfoot, Kingstown. *St. Lucia:* Mr. R. G. McHugh, Castries, *Dominica:* Messrs. C. F. Duverney & Co., Market St. Roseau. *Montserrat:* Mr. W. Llewellyn Wall, Plymouth: *Antigua:* Mr. F. Forrest St. John's. *St. Kitts:* Messrs. S. L. Horsford & Co., Basseterre

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A Foreign Agricultural Department writes dating 9th September, 1901:—"Please accept our order for 175 lb. of Tea seed and for 2,000 Coffee beans. In regard to Coffee seed I would say that this will be the first importation made by this Department, and we will leave the selection of the varieties to be sent to your judgement."

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Total Assurances Issued	$11,752,403
Total Bonuses Declared (31 December 1900)	3,610,921
Sums Assured and Bonuses Existing	5,154,157
Total Claims by Death and Matured Endowments	5,375,545
Life Assurance Fund	2,118,650
Annual Income	245,345
Net Surplus December (31 1900)	297,124

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May 22, 1902.

H. J. INNISS,
Secretary.

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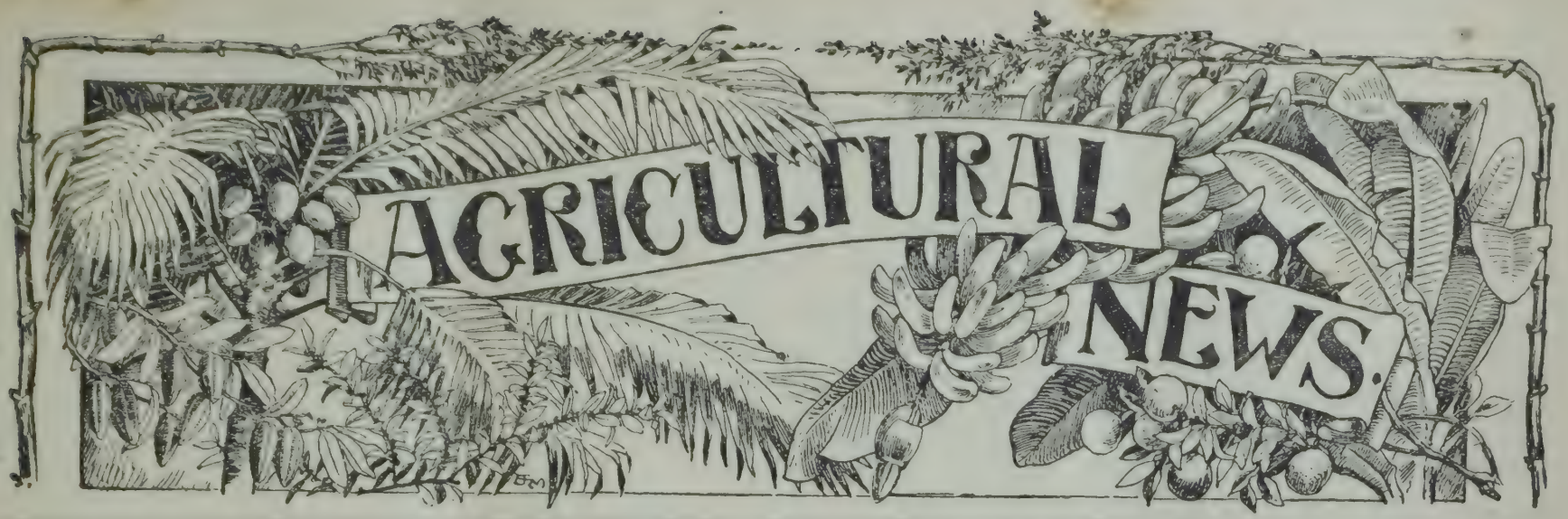

A FORTNIGHTLY REVIEW

OF THE

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West Indian Sugar Industry.

UNDER the title of 'The West Indies: a Warning and a Way' Mr. Norman Lamont has contributed to *The Empire Review* for August a thoughtful article which deserves more than a passing notice. Mr. Lamont is proprietor of one of the most important sugar estates in Trinidad, and evidently possesses a wide knowledge of his subject. He starts with the statement that the 'West Indian sugar industry is suffering not only from the effects of the bounties but from a deeply-seated internal disease.' With regard to the latter, it is pointed out that even in the sugar factories with good machinery 'there has been no corresponding improvement in the management of that machinery or in the manipulation of the juice . . . in many West Indian sugar-houses that important officer, a chemist, is absent, while in others he merely accumulates a mass of figures and statistics which are not turned to any practical account . . . there is frequently a lamentable want of co-ordination between the different departments . . . the economy of labour and the adoption of labour-saving devices . . . have hardly begun to be seriously studied.'

Turning to the field, Mr. Lamont is of opinion 'the case is still more deplorable.' Except in a few localities 'the various operations incident to the preparation and tillage of the soil are all performed by hand at an enormous cost . . . rotation of crops is scarcely practised . . . ratooning is still largely in vogue and naturally diminishes the yield per acre . . . in the vital matter of the application of chemical fertilizers to the soil, there is room for the greatest improvement . . . at present they are usually applied in an utterly haphazard manner.'

After reviewing the nature of the internal disease, Mr. Lamont endeavours to point out the cause :—'The West Indian backwardness is directly due to two causes: first, the abundance of labourers, working for a

low wage; secondly, the extreme rarity of skilled scientific direction.' It is insisted upon that 'the abundance of labour has stunted the desire for, and the adoption of, labour-saving appliances, both in the field and the factory;' and in regard to the absence of scientific direction, the West Indian planters are described as 'having endeavoured to continue the fight against the scientists and specialists of Continental Europe and the United States with a class of men whose technical knowledge is hopelessly inadequate.'

Mr. Lamont deprecates the idea of introducing skilled men from other countries to revive the sugar industry of the West Indies. He asks, 'why is it that among young men, born and bred in the West Indies, and therefore acclimatized, we see no competition for positions of trust on the sugar plantations or in the sugar factories? We see battalions of them pouring into the legal and medical professions . . . all this is utterly wrong . . . the youth of the West Indies must be given facilities for a wider range of choice of occupation. . . I have said that you cannot successfully conduct the sugar (or any other) industry of the West Indies without trained intelligence; I will say more, you cannot conduct it without trained West Indian intelligence.'

Coming to the means or the 'way' of saving the West Indian sugar industry, Mr. Lamont expresses the opinion that 'the crying need of the West Indian Colonies is a University of Tropical Agriculture. It is an imperative necessity that their young men should be trained to take part in building up the future of their country upon the only substantial foundation, and in making their agriculture an example instead of a by-word; for in agriculture alone lies the promise of any permanent prosperity for these "British Dominions beyond the Seas."'

After describing in detail proposals for establishing a University of Agriculture, Mr. Lamont concludes:— 'For the solution of these vital West Indian problems I appeal to the business instinct of the people of this country, and to the ever-watchful alertness of the distinguished statesman who presides over the destinies of our Colonies. Mr. Chamberlain has won for himself in the hearts and minds of the West Indian people a place occupied by none of his predecessors at the Colonial Office; and I predict with confidence that if out of the germ of his "Imperial Department of Agriculture," he evolves an agricultural, mechanical, and commercial university, he will not only restore a large measure of prosperity to the West Indies but immeasurably strengthen the bonds that unite them to the mother country.'

SUGAR INDUSTRY.

Note on Cross fertilization of the Sugar-Cane in Java.

Since the independent establishment by Dr. Soltwedel in Java and by Messrs. Harrison and J. R. Bovell in Barbados that the sugar-cane bears fertile seed, investigations in Java have centred around two other important discoveries.

In 1894 Dr. J. H. Wakker, then Director of the East Java Sugar Experiment Station, found out that the Cheribon cane bears infertile pollen while the ovary is normal. Consequently any fertile seeds formed by this cane are the result of cross fertilization, by the pollen of another variety of cane, and give rise to hybrid plants. About this time the new seedling canes raised were only those of well known mother canes, *e.g.*, of the Cheribon. The Cheribon in Java, like the Bourbon in the West Indies, is a cane with rich and abundant juice and is therefore valuable as a sugar producer. Unfortunately, like the Bourbon, it is liable to disease.

Soon after Wakker's discovery, Dr. Kobus, the present Director of East Java Sugar Experiment Station, suggested the crossing of the Cheribon with certain of the East Indian canes imported by the Java Government from British India so as to raise seedlings from the former cane crossed by the latter, some of which would probably combine the good qualities of the Cheribon with the disease-resisting power of the East Indian canes. Experiments at this Station were set on foot to cross the Cheribon with the Chunnee variety from India, a very vigorous and disease-resisting cane. Dr. Kobus has published four reports on the results of the seedlings obtained from the Cheribon-Chunnee cross. In raising the seeds the parent plants were planted alternately in rows:—

Cher.	*Chun.*	*Cher.*	*Chun.*
x	x	x	x
x	x	x	x
x	x	x	x
x	x	x	x
x	x	x	x
x	x	x	x
x	x	x	x

The reports are entitled *De zaadplanten der kruising van Cheribonriet met de Englesch-Indische variëteit Chunnee*, and were published as the Proceedings of the East Java Station Nos. 1, 12, 21, 33 of the Third Series.

The seedlings raised are observed for four years at the Station and compared with the Cheribon. The best are then distributed to the estates. The anticipation of Dr. Kobus have been realized as canes combining both high sugar content and disease-resisting power have been obtained by this cross. The yield of sugar of some of the canes varies from 6 to 8 tons per acre. In some cases the fecundating power of the pollen of the Chunnee is so strong that more than 95 per cent. of the hybrids resemble the male parent.

Sugar Production in St. Lucia.

Mr. G. S. Hudson, the Agricultural Instructor, St. Lucia, reports:—

A recent inspection of all sugar-producing estates in the island showed a total area in sugar-cane of about 3,000 acres, of which some 2,200 acres are connected with the four central factories, the balance being devoted to muscovado and syrup production. The central factories show an average of about 22 tons of canes producing 2 tons of sugar to the acre. On muscovado estates, where steam or water power is employed, about 1 ton of sugar is the product of an acre, and where cattle power is used the production falls as low as ½ ton per acre. On the smaller estates no record of weight of canes is kept, but their methods and crops are, of course, very inferior to those of central factories. There is no material reduction of area under cultivation for 1903, and only the stimulus of prices showing even a small margin of profit, is required to enlarge this area considerably.

Molascuit.

Attention has been called in this Journal (p. 22) to the preparation of 'Molascuit,' a new stock food which it has been suggested might form an article of export from the West Indies. Further, the value of molasses as a food for horses has also been referred to in these pages (pp. 66, 108 and 124).

The advantages claimed for the new product are that vacuum pan molasses can be used in its preparation and that the manufactured article can be handled as a dried food stuff.

One important matter however seems to have been overlooked, namely, the digestibility of the product. The fine megass used in its preparation consists of small fragments of the vascular strands and cells of the cane, the former of which are really pieces of cellulose tubing with open ends. It is possible that a portion of the molasses will escape digestion and will be expelled from the alimentary tract unchanged. Before therefore the value of molascuit as a stock food can be seriously entertained by practical men, it is suggested that digestion experiments should be undertaken to find out how much of the molasses can actually be absorbed by the animal.

SURRA DISEASE IN HORSES.

A short note on this disease appeared in the last issue of the *Agricultural News* (page 134). It is desirable to supplement the information there given so that our readers may have some indications of the character of the disease and the symptoms that accompany it.

The first indications are usually impairment of appetite, constipation, fever and thirst. These are followed within a few days by rapid and progressive emaciation. There are nearly always presented 'swellings of the sheath, legs, and pads under the belly.' These are described as marked symptoms. The course of the disease may extend from a few weeks to two or three months. As already stated, the disease (of a malarial type) is due to infection, transmitted by biting-flies. The examination of the blood, in a well-marked case, shows the existence of a microscopic animal parasite, 'a whip-like worm' rather blunt at one end with a flagellum at the other. The pathological change caused by the parasite (flagellate) is a rapid destruction of the red blood-corpuscles causing an acute anemia.

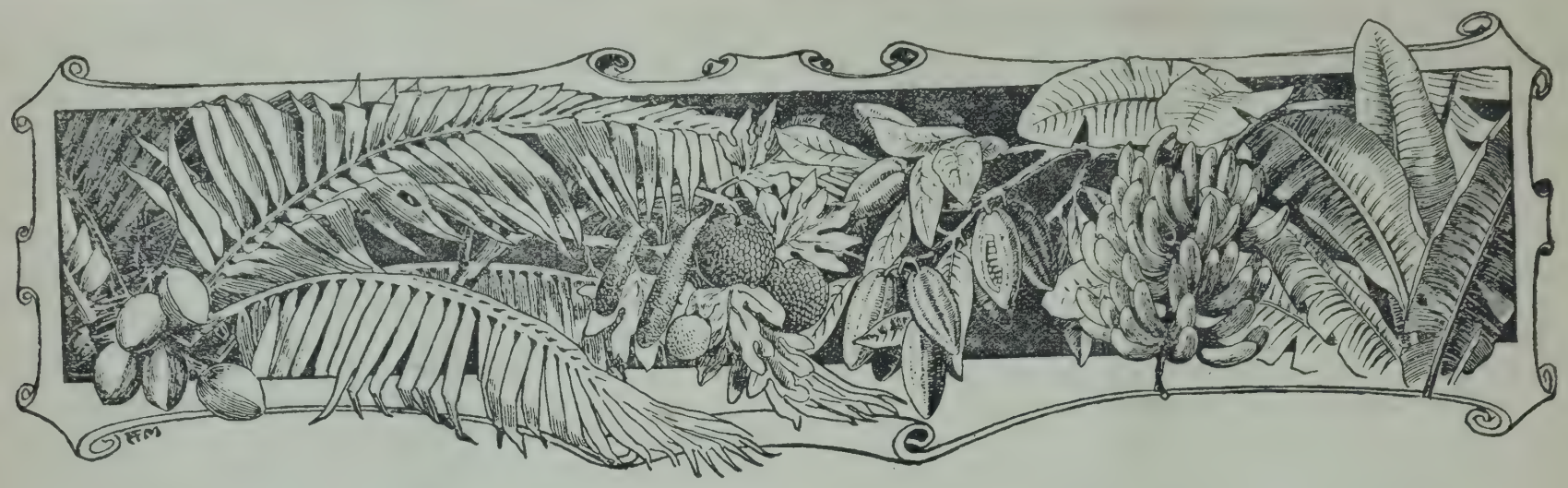
The following extract taken from the Report issued by the United States Department of Agriculture (Bureau of Animal Industry. *Bulletin No. 43, 1902)* contains the official definition of the Surra Disease:—

Surra is a specific and continuous infectious febrile disease occurring in solipeds and camels, and capable of being transmitted by inoculation to other animals. It is due to the presence of a flagellate protozoon *(Trypanosoma Evansi)* in the blood. It is chiefly met with in an epidemic form, during certain months of the year, namely, during or immediately following the wet seasons. It is characterized by an intermittent, remittent, and sometimes a relapsing, type of fever which continues for varying periods, from a few days to months, according to the species and the constitutions of the animals attacked, and presents definite symptoms following one another in regular sequence. The chief symptoms, in addition to the fever, are the occasional appearance of an urticarial eruption, general or localized, closely following the first rise in temperature, but which may make its appearance at any time during the course of the disease; then the presence of petechiae on the mucous membranes, chiefly those covering the membrana nictitans; lachrymation, and the exudation of a yellow semigelatinous material into the subcutaneous and other connective tissues. There is rapid wasting and great weakness, although in the great majority of cases the appetite remains good throughout, no matter how high the fever is. There is extreme pallor of the visible mucous membranes, and this is followed at a later period by yellowness. From first to last there is progressive anemia; the blood at first presents a normal character, but after a varying period of time undergoes marked changes. The white corpuscles are increased in number, and the red corpuscles usually cease to form normal rouleaux, lose their individuality, and run together, forming irregular masses, which at first dark, but gradually, as the disease advances, almost entirely lose their colouring matter and become pale.

The presence of the flagellate is not continuous during the whole course of the disease. At first it is usually found in small numbers in the blood, and increases with greater or less rapidity until, having attained a maximum, it disappears either gradually or suddenly, to reappear after an interval. The periods during which it is present in and absent from the blood are marked by extreme irregularity, varying from one to six days, but the latter number is very unusual.

The disease is invariably fatal, death being generally due to exhaustion, but sometimes to concurrent complications. After death no specific lesion is present, but as a rule there are small subpleural and subendocardial extravasations, together with enlargement of the liver and spleen, and if death takes place during the paroxysm the hematozoon will be found for a certain time in the blood.

We would repeat the note of warning given on page 134, and strongly recommend that, for the present, and until we are more fully informed as to the occurrence of Surra in the United States, no American horses or mules should be landed in any part of the West Indies. In the meantime it would be desirable that the character and symptoms of the disease be carefully studied in the Bulletin above referred to. This contains a summary of the literature on the subject and numerous illustrations of the parasite and affected animals.



WEST INDIAN FRUIT.

NOTES FROM TOBAGO.

Mr. D. Macgillivray, a well known resident of Tobago, has contributed the following notes on grafting and budding nutmeg and fruit trees. They afford an interesting sketch of the difficulties that are usually met with in these Colonies, difficulties, it is hoped, that will eventually disappear by means of the circulation of the *Agricultural News* and other plainly worded publications of the Department, and also by the advice and assistance of the Curators of the Botanic Stations and of the travelling Agricultural Instructors being generally utilized:—

NUTMEGS.

I have seen notes in the *News* about grafting nutmegs. I once took a plant in a bamboo pot from my nursery (male or female, I knew not) and grafted it by approach to a young sucker of an old female tree. This I have planted out, but it will never make a shapely tree. The nutmeg, like the cacao, throws out suckers of two kinds. One the shape of a lateral branch, the other tree-shaped. I have tried transplanting a young male underneath a female having the tree-shaped suckers and grafting by approach but failed. I have gone in for nutmegs on a small scale. Their present small commercial value does not encourage one to go in for them extensively, and my soil, a light sandy loam, is very susceptible to the effects of the sun in the pinch of the dry season. Some of my large bearing trees were nearly killed out two seasons ago.

GRAFTING OR BUDDING SOUR ORANGES.

About twenty years ago I sowed seeds of a specially sweet orange. I raised about thirty and planted them out. The trees came to maturity and bore sour oranges. The majority of them came into bearing in seven or eight years. Seven of them grew to be large trees but did not bear until they were twelve to fifteen years old, and then they gave me very fine sweet oranges. I cut down some of the sour orange trees 3 feet from the ground, allowed selected shoots to grow two on each stump, and, in the case of two trees, have ring-budded them with shaddock. One tree has succeeded admirably: the buds sprang and the branches are now about 10 feet high and will, I hope, soon bear. The other ring-budding (two buds on two separate suckers) took and lived, but the buds would not spring. I have since then done some budding of the ordinary kind, cutting a bud from the shaddock and inserting it in a cut in the bark of the scion. Several have taken, but in only one case have I been able to induce the bud to spring. I am an extremely green amateur with very little time from my daily work to devote to agriculture. I now write in the hope that some of the correspondents of the Department, experts in citrus cultivation, may be able to point out the cause of my failure. Are there barren and fertile buds on a branch, and how can they be distinguished? Or is my experience of barren buds the result of taking buds from a young tree that has not yet borne?

I may mention that any information conveyed to me cannot be too elementary, as I have never witnessed the operation of grafting or budding by any one, and I feel sure my methods are clumsy. I have succeeded in grafting several mangos 'by approach,' but in 'Crown' and other kinds of grafting I have always failed.

LABUAN POMELO.

The 'shaddock' which I have been trying to propagate is a thornless one and the fruit is seedless, the finest shaddock, Mr. Hart says, that he has ever seen. It is really a Labuan pomelo sent from Labuan by Mr. Ussher, a former Lieutenant-Governor of Tobago, to the late Mr. D. Yeates here. Mr. Yeates kindly gave me a plant grown from a cutting under glass. It bore splendid fruit for some years and then succumbed to an attack of fungus at the root. Fortunately, at the suggestion of Mr. Hart, when the tree was in full vigour, I sent him some cuttings. From these he succeeded in making three grafts, one of which he kindly sent me. The other two are thriving trees at St. Clair. I may mention that I was recently particularly gratified by receiving from Mr. Hart a budded plant of the shaddock together with two orange plants (navel and pine-apple) all of which I have planted out as Coronation Trees. With regard to the name, I prefer to call my plant pomelo instead of shaddock. The ordinary West Indian shaddock is a very degenerate fruit.

I have always thought it a disgrace to Tobago to have so few good fruit trees. Now that there is a prospect of a prosperous future for good West Indian fruit, every assistance and guidance ought to be given to our people here in the work of grafting and budding so that in the future no one will dream of raising a mere seedling for the sake of its fruit.

ENGLISH POTATOS.

CULTIVATION EXPERIMENTS IN THE WEST INDIES.

Attention has been given by the Imperial Department of Agriculture during the last three years to the question of growing English potatos in the West Indies. An attempt, suggested by Mr. James Martland, a leading English merchant interested in the subject, was made in 1900 to establish an industry in raising early potatos for the English market. Experiments were carried on between December of that year and March 1901 by the local officers of the Department at Barbados, St. Vincent, Dominica, Montserrat and St. Kitt's-Nevis. The seed was obtained from Mr. Martland and arrived in the West Indies in November. During the severe drought experienced in these islands at the close of 1900, the plants suffered severely and were also attacked by both insect and fungoid pests. Owing to these drawbacks, the results obtained were unsatisfactory. The total yield of potatos rarely exceeded 4 tons per acre. Over 60 per cent. of the tubers, in some cases, were either damaged or undersized and therefore unsaleable. After discarding these, the sound potatos were shipped to England and offered for sale in the London and Liverpool markets. The reports received with regard to these shipments were not favourable, the potatos only realizing from 3*s.* to 5*s.* per cwt. A further sowing was made in the same islands in December of 1901. The results of these experiments may be gathered from the reports of the officers in charge them.

At *Barbados* Mr. J. R. Bovell, the Superintendent of the Botanic Station, writes:—'When these potatos arrived the long drought had just commenced so that not only did the potatos grow badly but there was practically no result, the "seed" that did grow producing potatos about the size of walnuts. This I think is in great measure due not only to the drought but also to the fact that they were planted too late in the season. In confirmation of this, I may mention that at the request of the Hon'ble Dr. John Sealy, I imported three barrels of "Bliss Triumph" potatos from Messrs. Peter Henderson & Co., of New York, the potatos arriving here on November 8. These potatos, in spite of the drought, did fairly well.' A memorandum of the results of this experiment was prepared by Dr. Sealy and shows that from one sixth of an acre, 740 lb. of marketable potatos were obtained at a cost, including artificial manure, of $9.01. Placing the market value of the potatos at 2*c.* per lb, there appeared a net profit on the transaction of $5.79 or about $35 per acre.

From *St. Vincent,* Mr. Powell, the Curator of the Botanic Station, reports: 'The plot of English potatos at the Botanic Station, at one time very promising was almost entirely destroyed by mole crickets. From 1½ acres only 18 lb. of potatos were obtained.'

At *Dominica,* Mr. Jones, the Curator of the Botanic Station, mentions that 'the results were poor. One barrel of "Scottish Triumphs," which again did better than the other kinds, was sent to Barbados and realized $4.00.'

At *Montserrat,* Mr. Jordan, the Agricultural Instructor, states: 'The English potatos have not done well again this year owing to late planting. In the early part of February the plants looked as healthy and promising as any I have seen in England, but just at the time the tubers were forming, dry weather was experienced, with the result that, when dug, the potatos were found to be numerous but very small. It is evident that good results cannot be expected if the potatos are planted later than the middle of October.'

At *St. Kitts,* Mr. Lunt, the Curator of the Botanic Station, mentions: 'A further experiment with potatos (English) was conducted. The results were not satisfactory and tend to prove that we cannot obtain what are recognized as *new potatos* here, their flavour and condition when reaped being precisely that of old potatos.'

At *Jamaica* where corrresponding experiments were conducted in 1900-01 (*Journal of the Jamaica Agricultural Society,* Vol. V., pp. 237-241) the reports show that while satisfactory yields were obtained on the upper lands, the crop on the lowlands was a failure owing to drought. Both at Jamaica and in the Windward and Leeward Islands the variety of potatos known as the 'Scottish Triumph' was found to be by far the most suitable for cultivation under all conditions of soil and climate.

So far as the smaller islands are concerned, the results of these experiments, although not so successful as was anticipated, yet afford valuable information to those who may think of taking up the industry at any future period. It is important to bear in mind that while on the cool highlands the time of planting may be slightly extended, on the lowlands, owing to the risk of drought during the months of November to February, successful results can only be expected if the potatos are planted out early in October, and it would always be of advantage if they could be irrigated during spells of dry weather.

LIME INDUSTRY OF MONTSERRAT.

The following extract is taken from the *Montserrat Herald* of August 9, 1902:—

It is just three years since the lime industry of the Montserrat Company was destroyed, and so complete was the destruction, that it was intimated that the Company had contemplated packing up and clearing out of the island to established themselves somewhere else outside the hurricane zone. It was not until after Mr. Joseph Sturge, the Director, came from Birmingham and visited the scene of devastation in the fall of the year, that it was decided to re-establish the lime cultivation on a limited scale. Six years was the time computed for the company to get any return on their outlay. But the rapid growth and healthy appearance of the limes, and the bearing of some in less than three years have been something marvellous. That the prospect of the Company for the year is 600 casks of raw and concentrated juice is surpassing the most sanguine expectation. And this shows how adapted is the soil of this island to the growth of the lime. It is to be hoped that the outlook may encourage the Company to extend their cultivation. That Mr. Driver the Company's Attorney, and his coadjutors are deserving of praise goes without saying. So far as the lime industry goes, if everything else in the island were as hopeful, in five years' time, the material condition of the Presidency would be in a healthy state.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the **Commissioner, Imperial Department of Agriculture, Barbados.**

It is particularly requested that no letters be addressed to any member of the staff by name. Such a course may entail delay.

Communications should always be written on one side of the paper only. It should be understood that no contributions or specimens will, in any case, be returned.

All application for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on the last page of this number.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News

Vol. I. SATURDAY, AUGUST 30, 1902. No. 10.

NOTES AND COMMENTS.

Vanilla Cuttings from Vera Cruz.

Replying to an inquiry as to the price of vanilla vine slips at Vera Cruz, Mr. L. J. Nunn, the Vice-Consul of that place, writes:—

The best Vanilla vine slips would cost you free on board Vera Cruz from $30.00 to $35.00, Mexican currency, per thousand, or more or less £3 to £3 10*s*. The cost to ship them from here to New York would be $5, United States currency, this being the minimum rate of freight on any parcel.

I must also inform you that it is not possible to buy per hundred, as you would be charged just the same per hundred as you would be per thousand.

Agricultural Exhibitions in British Guiana.

The Board of Agriculture has recently published a resolution setting forth the lines on which it is proposed in future to assist Agricultural Exhibitions and Farmers' Competitions in the Colony.

Three classes of Exhibitions are recognized: (1) Colonial Exhibitions to be held triennially, or otherwise, at Georgetown; (2) County Exhibitions to be held annually in one of the three counties, the first at New Amsterdam with a grant of $500; (3) District Exhibitions to be held in selected villages, with a grant of $150, on condition that $120 shall be expended in prizes leaving $30 available for general expenses.

It is laid down that Agricultural Exhibitions aided by the Board of Agriculture 'shall include only Exhibitions of Field and Garden produce of Economic importance and Live Stock.'

Toronto Exhibition, 1902.

As a contribution to this Exhibition from the Imperial Department of Agriculture for the West Indies there were despatched by *S.S. Sobralense* on the 14th instant, two large cases containing copies of the Bulletins, Pamphlets, Leaflets and other publications recently issued by the Department. There was also forwarded an attractive looking pamphlet specially prepared for this Exhibition containing facts and figures respecting the resources and products of the West Indies, list of exports and a popular description of each of the principal West Indian products, suitable for Canadian readers.

These publications are intended to be distributed at the West Indian Section free of charge.

Growing Onions for Sets.

The soil should be only moderately fertile for growing sets, but free from little stones and weed seeds. Seed is drilled in at the rate of from 50 to 60 lb. per acre. It is desirable to defer sowing until most of the weed seeds which may be present in the soil have germinated. The aim of the grower should be to secure a crop of very small bulbs as nearly uniform in size as possible. The price received is largely regulated by the size of the sets. Of course, a bushel of the smallest sets will plant a greater area than the same quantity of the larger ones, hence they command a higher price. When mature, the sets are lifted by a trowel and deposited with the surrounding soil in a sieve with meshes small enough to hold the smallest bulbs. A crib or dry, well-ventilated apartment may be used to cure the onions, spreading them in thin layers. It is extremely important to dry the sets thoroughly so that they will remain in an entirely dormant condition until sold or planted. Before the final storing a fanning mill is used to remove the loose skins or other light refuse. White sets command the highest price.

For further particulars see Pamphlet No. 16, *Hints on Onion Cultivation*, obtainable from all Local Agents of the Department. Price 2*d*. Post free 2½*d*.

Duty on Exported Sugar at St. Kitt's.

According to the Export Duty Ordinance of 1898, the following duties are levied on sugar and rum exported from St. Kitt's and Nevis:—

	s.	*d.*
Sugar—		
Per hogshead, not above 42 inches truss	4	8
„ tierce „ 30 „ „	3	2
„ barrel	0	6½
In other packages... ... per ton	4	8
Rum—		
Per 100 gallons	3	6

The receipts go to the general revenue.

Bananas in the United States.

A recent number of the official *Crop Reporter* of the United States Department of Agriculture gives an interesting summary of the banana trade of the States. During the last thirty years the imports of bananas have increased so rapidly that they are now the most important single factor in the fresh fruit trade, export or import, of the country. The significance of this may be realized by noting that the annual value of the bananas imported is about three times that of apples exported.

The United States is almost entirely dependent on imports for its bananas. Southern Florida usually presents favourable condition for their cultivation, as instanced by its output of bananas being 32,000 bunches in 1889, increasing to 67,000 bunches in 1893. In 1894 came the 'great freeze' and the output was nil. From this blow the industry has been slow to recover, the number of bunches produced by Florida in 1899 being only 3,782.

The principal sources of bananas for the States are Central America and the West Indies. In 1900 Central America sent to the States bananas to the value of $2,340,000, the British West Indies $2,172,000, and Cuba and Santo Domingo $234,000. In addition bananas to the value of $999,000 were received from Colombia, $96,179 from British Honduras, and $36,000 from Hawaii. The total imports of bananas into the United States in 1900 were approximately of the value of $6,000,000, or £1,250,000.

Arbor Day.

It is gratifying to find that active steps have been taken to give practical effect to the suggestion made in the *Agricultural News* of establishing an Arbor Day in the West Indies.

At *Trinidad* Mr. J. H. Hart reports that a tree was planted on Coronation Day (August 9) in the Queen's Park Savannah by his Excellency the Acting Governor, Sir C. C. Knollys, K.C.M.G. Mr. Hart continues: 'It is to be hoped that this excellent example will be followed in each subsequent year by the people in general. The time of year is especially suitable for planting purposes in Trinidad and it would be a great encouragement to cultivators were a regular day set apart each year for the purpose of planting trees. It is a practice which would tend largely to the benefit of the community, and in which the poor as well as the rich may share, and the ninth of August each year might well be commemorated by the planting of fruit, timber, or ornamental trees.'

At *Grenada* his Excellency the Governor planted a Genip Tree in the Anglican Churchyard, immediately after the Coronation Service, in the presence of a large number of the Officials and other residents of the island. Mr. Broadway, the Curator, reports that in all eighty-five trees were planted, some on July 2, the remainder on August 9. In addition to the Genip, trees were planted at the Botanic Station, Government House, the Ballast Ground, the Presbyterian Church, the Bower, St. Georges, the Wesleyan Church, the Convent, the Market Square St. Georges, etc.

At *Tobago* also, several trees were planted on June 26, and several further Coronation trees on August 9.

Weeding.

Adverting to the importance of weeding in the cultivation of various crops, the Agricultural Instructor of St. Lucia writes:—

Considering that about fifty per cent. of the expenditure in all planting ventures is devoted to weeding, it is astonishing how little comment is ever given to this subject in agricultural literature: how few proprietors or managers possess any first-hand knowledge on this matter. The work is generally relegated to the weeding overseer or ganger, generally a man of few attainments: the manager can tell us how much his weeding costs and there his knowledge ceases. It is a common thing for the writer to visit two adjoining estates where conditions are almost similar, and to ascertain that the weeding on one estate costs double what it does on the other. It is generally lack of *proper* economy in this item that makes for failure, or absence of profit. This is a large subject and cannot be fully treated here, but the following advice may be appropriate. Every manager (even though he cannot do it continually) should find time for an occasional day behind his weeding gangs. It is absolutely imperative during rainy weather to limit the use of the hoe as much as possible in favour of the cutlass, and to go back over your weeding and turn all heaps of weeds (shaking out all soil) within seven or ten days of weeding, choosing the driest weather for this work. It is a case of 'a stitch in time saving nine'. One shilling spent in turning weed heaps will save nine shillings' worth of weeding.

Snakes of Barbados.

There are comparatively few reptiles existing in Barbados, and it is possible that some of them will, if they have not already, soon disappear owing to the introduction of the mongoose. Two species of snakes have been recorded. The larger one (*Liophis perfuscus*) is known only from Barbados. It is singular that it has been found nowhere else in the West Indies. In the early days of the settlement of the island this snake, though completely harmless, was troublesome from its habit of crawling in through the windows of the dairies and drinking the milk. At the present day it is so scarce that few people have seen it. A smaller snake (*Stenostoma bilineatum*) called the 'seven-year snake,' because he or she who killed one was supposed to obtain remission of sins for a like period is still more rare. It is said to occur at Martinique and Guadeloupe. It would be interesting to learn whether either of these two harmless and interesting reptiles of Barbados have been seen in any part of the island within the last year or two.

Old Tree Stumps.

To remove old stumps, a correspondent to the *Country Gentleman* gives the following:—'Get a 2-inch iron pipe, 8 ft. long; have a steel point welded into one end of it. With a sledge hammer drive this under the stump as far as may be necessary. Drop half a stick of dynamite into the hole thus made, and tramp earth upon it until the hole is filled, then light the fuse. The stump will be lifted entirely out of the ground with no earth adhering to it, so that it may be burned the next day.'

BEE-KEEPING.

Grenada.

The bee-keeping industry is reported to be progressing favourably in Grenada. Several Italian queen bees are said to have been imported from Jamaica and America by bee-keepers in the island. The question as to whether eight-frame hives are preferable to ten-frame hives in the production of section honey is attracting attention. This would seem in a great measure to depend upon local conditions, and the amount and the duration of the honey flow, matters which can only be determined by local experiments.

Cure for foul-brood.

The following method for the cure of foul-brood in hives, reproduced by the *Canadian Bee Journal* for July 1902, should be of interest to bee-keepers in the West Indies :—

Sections of comb were taken out and placed in a box the same size as an ordinary hive. The exit at the bottom was plugged with the exception of a small hole, and a small opening about half an inch in diameter was left at the top. To the lower hole was affixed a formalin apparatus consisting of a small alcohol lamp at the bottom, with a reservoir at the top which contains formalin. Formalin, I may say, is the trade name given to a 40 per cent. solution of formic aldehyde in water. A small portion of this is put in the reservoir over the alcohol heater and then the top is screwed down. The top connects with a small hose pipe, and it is placed in the lower hole of the hive. Directly after the apparatus is attached the alcohol lamp is lit and the formalin is vapourized and spreads throughout the hive. This means of disinfecting the hives was used ; and the wax of the comb that was placed in it was several years old, judging from the looks of it, and contained dead larvae, foul-brood, and also a certain number of capped cells, so that probably all the conditions were present which would be met with in a bad case of foul-brood. After the gas had spread through the hive, and the smell of the gas could be noticed issuing at the hole at the top, this top hole was closed and almost immediately afterwards the formalin apparatus was disconnected and the lower opening plugged up, and it was kept thus from one to four hours. At the end of that time the hive or box was opened and the combs taken out and a careful examination made not only of the capped cells but also of the foul-brood cells and of certain marked cells which contained honey and also spores of the foul-brood bacillus. In not a single instance did foul-brood germs grow from these combs after they were treated. Since then I have performed the experiment three separate times with three other distinct combs and with equal success. In each case the germs were killed, whether they were in dead larvae, whether they were in honey, or whether they were in capped cells.

RICE CULTIVATION: BRITISH GUIANA.

INTERESTING STATISTICS.

A summary of information respecting the cultivation of Rice in British Guiana was published in the *West Indian Bulletin*, Vol. II., pp. 275-84. It would appear from an interesting article contributed to the Demerara *Argosy* of August 9, that the industry, in spite of many difficulties, is steadily extending and that in consequence, the importations of rice into the Colony during the last seventeen years have decreased to less than one-third. The following table shows the imports (in pounds weight) for certain years from 1885 to 1902 inclusive :

1885	...	...	...	50,572,740
1889	...	...	...	46,930,392
1895	...	...	...	33,219,824
1899	...	...	...	25,060,493
1902	...	...	...	15,213,303

The article states that these figures clearly indicate the highly significant fact that were the local rice industry sufficiently capitalized and efficiently managed, the inhabitants would not only be able to be supplied with rice 'on the premises' but be in the position of shipping rice out of the country.

The successive stages in the early history of rice growing are described. The pioneering efforts of the late Mr. William Russell, Mr. Colvin and Mr. Bascom drew special attention to the subject and, at the present time, rice growing gives employment to a large number of the peasantry—East Indians, Chinese and Creoles. From a return recently published by the Board of Agriculture it would appear that there are about 19,119 acres under rice cultivation in the Colony yielding, approximately, 395,948 bags of rice.

The chief difficulty hitherto experienced has been milling the paddy and converting it into clean rice. The principal cause of this is said to be the unsuitability of the machinery that was imported for the Rice Factory in Georgetown. The article in the *Argosy* concludes as follows :—'So far, there has been more success in the cultivation of the rice than in its manufacture—the very reverse, by the way, of the cane sugar industry. But there is no good reason why rice should not develop into a large and remunerative industry, for our coast lands are eminently suited for the cultivation ; while the profits are large, so large indeed that the profit of a fat year is quite sufficient to counterbalance the loss of a lean year.'

Scale Insects and Moulds. Some time ago specimens of the 'Brown Shield Scale' covered by a yellowish white fungus were forwarded to the Department by Mr. Sands, the Curator of the Botanic Station, Antigua, who reported that the fungus apparently attacked both young and old scales. Unfortunately at the time, the fungus was only in the vegetative condition and therefore could not be determined. Inoculation experiments were made on healthy specimens of the scale insect at Barbados, but the results were negative. The weather at the time however was extremely dry, and negative results under these conditions are not conclusive. Further careful study is necessary to determine whether or not the fungus is a parasite or only one of the sequels of some other natural enemy.

COTTON GROWING IN THE LEEWARD ISLANDS.

In the *Agricultural News* (p. 103) mention was made of the experiments that have recently been conducted by the Imperial Department of Agriculture with a view of testing the possibility of re-establishing a cotton industry at St. Lucia and Montserrat. The following interesting paper, on cotton growing in the Leeward Islands, read by the Hon. Francis Watts, Government and Analytical Chemist, before a meeting of the Agricultural and Commercial Society of Antigua on August 1, throws additional light and points to the possibility of the industry being successfully re-established in a few, at least, of the Leeward Islands:—

The question of cotton planting has recently received a good deal of attention in several of the West Indian Colonies, planters being urged thereto by the rapid fall in the price of sugar. When muscovado sugar can be sold for good prices, such as £10 per ton and upwards, there is little inducement for the inhabitants of such places as Antigua, St Kitt's, Nevis and Montserrat to think of cotton growing, for people can find profitable employment in the long-established industry and cotton offers no prospect of greater gain or more congenial employment.

But now matters are on a different footing. Sugar of 89° test is selling at about £5 to £5 10*s.* a ton, and molasses is difficult of sale at 2*d.* per gallon. On the other hand, cotton appears to be in increasing demand, and relatively high prices appear to be obtainable for certain kinds. This being so, cotton warrants careful attention on the part of landowners in these islands.

VARIETIES OF COTTON.

Varieties of cotton are roughly divided into two kinds: (a) long stapled and (b) short stapled. Amongst the former is the variety known as 'sea island': this has unusually long silken fibres and for this reason the product is always valued at a much higher price than that of short-fibred varieties. This variety of cotton can only be grown successfully in a limited area; in the great cotton-producing areas of the United States it can only be cultivated commercially in the maritime districts of the Southern States, though the enterprise and skill of the American agriculturist is breaking down this restriction. It is this restriction of area which gives rise to the relatively high price. Now the point of interest for us in the Leeward Islands is, that this variety of cotton is a native of these islands: the West Indian Islands are the countries of its origin, thus, with care and energy, we should be able to succeed in the cultivation of sea island cotton beyond those less favoured people amongst whom the plant is an introduced one.

Long stapled cottons of the sea island type are also grown to some extent in Egypt and the East Indies.

Short stapled cottons have a much wider range and are capable of cultivation in districts where sea island will not thrive. These short stapled cottons usually produce much heavier returns per acre, but the cotton is much less valuable than sea island.

With these facts before us, it is fairly evident that our energies should be directed towards growing sea island cotton, unless experiments prove to us that some other variety will produce such a large yield per acre as to compensate for its comparatively low price.

QUALITY OF COTTON.

If we are to attempt to establish a cotton industry in the Leeward Islands, I think there are several things we should set before our minds at the outset: we should endeavour to produce a high and uniform grade of cotton, and we should endeavour to put this upon the market in a uniform manner so as to establish well known marks and thus secure ready sales at maximum prices.

With regard to the first of these, we must remember that cotton carelessly grown from badly selected seed is liable to deteriorate year after year. Conversely, with care in the selection of seed, it may be improved. We are face to face with a danger, and at the same time have two means of averting it. The most rigid and careful selection of seed should therefore be the duty of every cotton planter in the Leeward Islands.

The demand for a long stapled cotton is increasing and there is some competition to secure a good supply. This offers us the opportunity of establishing a steady and reliable trade either with Great Britain or with the United States.

In some of the districts where sea island cotton is now grown, the industry is stated to be 'chiefly in the hands of small farmers of the coloured race, whose intelligence, skill and care are wholly occupied in securing a bare subsistence for themselves.' With our established estate system we ought to be able to improve upon those conditions and produce an article commanding the highest prices. If that can be done, cotton may prove a very remunerative crop.

PACKING.

Now, as to the packing, a neat package has much to do with the sale of high-class goods such as we must produce here if cotton is to pay. The ordinary cotton bale is anything but neat. One authority writes: 'Taken altogether it is generally admitted that the American bale is the clumsiest, dirtiest, most expensive, and most wasteful package in which cotton, or in fact any commodity of like value is put up anywhere. It has no friends either among manufacturers, buyers, shippers, insurers or producers. Custom seems alone responsible for this incubus on the industry.' (H. Hammond, *The Cotton Plant*, p. 362.) I learn that there is an improved method of baling known as the Bessonette system which, if not too costly, appears to be exactly suitable to the kind of trade we should endeavour to establish. By this system the cotton (lint) is tightly wound into a cylindrical bale about 30 inches long and 15 inches in diameter; these bales are easily covered with cotton cloth and the ends are capped with cotton cloth held in place by a small hoop of wire; no ties are used nor are they necessary, for the bale retains its shape without them. Prospective cotton growers are strongly advised to make inquiries as to the machinery required for this system of packing. A uniform system of baling for all the cotton from a given district is much to be desired, and at this stage, when all the plant will have to be purchased, we have the opportunity of securing the best, unhampered by old machinery and traditions.

No doubt, in the early stages of the new industry many mistakes will be made, but these will be less serious if a high ideal is intelligently aimed at. What we must see is that cotton is not merely cotton, but that there are good kinds and indifferent kinds. Good kinds may deteriorate with careless cultivation and careless handling, and we must recognize that we have all the conditions necessary to enable us to secure the best, and make up our minds to use our natural advantages to the full.

(To be continued.)

POULTRY.

The following notes on Breeds of Poultry are from the pen of Mr. John Barclay, of the Agricultural Society, Jamaica, in continuation of those in previous issues :—

PLYMOUTH ROCKS.

Of the all-round birds there are,—the Barred Plymouth Rock, an American breed, a fair layer and a fair table fowl of good medium size, hardy, but more suitable for the cooler and moister parts than the hot dry plains. Plymouth Rocks have yellow legs and skins ; the hens lay brown eggs of a fair size, are strong sitters, and make fairly good mothers. There are also the white and buff varieties with the same qualities.

ORPINGTONS.

Then there are the Orpingtons, English breeds, black and buff varieties, the former being the better layers, the latter the larger and better for table. They average about the same size as Plymouth Rocks and are of short and stocky build, good layers of light brown eggs, go broody and make good mothers. There are also the white, and two spangled varieties. The Buff Orpington is a first-class table fowl with white legs and white skin. The Black Orpington is much like a clean-legged Langshan.

It is to be noted that taste for table birds differs in the United States and Britain. In America, yellow-legged birds and so birds with yellow skins are the favourites ; in the United Kingdom and in France, table birds must have white skins to be first-class.

WYANDOTTES.

Then follow Wyandottes, of which there are white, buff, silver, golden, black, and partridge varieties ; they are smaller than Plymouth Rocks and Orpingtons, but rather better layers of rather small brown eggs ; the hens are good sitters and mothers. Plymouth Rocks and the Wyandottes are not old breeds like the Brahmas, Cochins and Langshans, but are latter-day productions of the United States, made by crossing various breeds—the big heavy Asiatic breeds with the smaller, non-sitting, laying breeds, and by a process of selection of the fittest made what they are—good utility fowls. The Orpingtons are also new breeds and were produced in England to fill the same end.

DORKINGS.

As a table fowl Dorkings are unsurpassed ; they have short white or pink legs, deep bodies, full breasts, small bones, white flesh, and would be suitable for dry localities in the West Indies where there is plenty of shade and a good run. The hens are rather poor layers of large, white eggs, and are strong sitters.

For table purposes we have, then, the Cornish Indian Game, large and heavy, but the hens poor layers, with the old English Game much more active and very useful for crossing but a great fighter. We have the Plymouth Rock, black and buff Orpingtons and Wyandottes as 'all-round' fowls. The Old English Game and the Indian Game thrive anywhere. The others while doing well in most places, are better suited in the cooler upland parts of the West Indies where there is shade for them to run. It is to be remembered that the all-round breeds mentioned were produced to be hardy in the cold north and are good winter layers there, which does not always mean hardy here : but still they have proved very adaptable. When, however, eggs are the principal object, and the table is a secondary consideration, we turn to the laying breeds, principally Leghorns and Minorcas, sometimes called the Mediterranean class, because they came originally from Italy and Spain. There are other purely laying breeds not Mediterranean, such as the Hamburgs, most beautiful birds but very small ; Campines of the same type from Holland, and Braekels from Belgium ; and there are also valuable French breeds such as the Houdans, Faverolles and La Fleche, but these not having been tested or proved in Jamaica (except the Houdan which would be the best fowl of all except for its large top-knot which obscures the eyes of the chickens so much that they fall an easy prey to hawks, vultures and mongooses)—I will not dwell upon them.

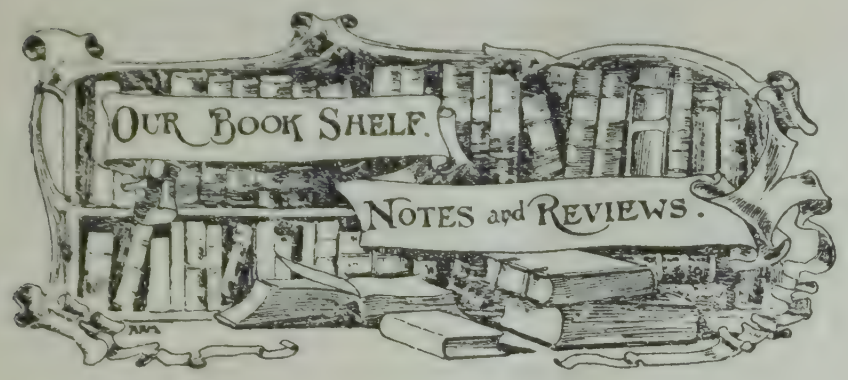
(To be continued.)

CACAO.

EXPERIMENT PLOTS AT GRENADA.

A report by Mr. Murdo McNeill, the Agricultural Instructor, for June last, gives an account of the work done in connexion with the experiment cacao plots at Vendôme, Belle Vue, Vincennes, Nianganfoix and Columbier estates, and other agricultural efforts in that Colony. Considerable improvement is recorded in the condition of the cacao trees in these plots since they were placed under the care of the Imperial Department of Agriculture. 'Results of the manurial experiments have been so far extremely satisfactory. At Nianganfoix estate, on Section A of the plot, treated with pen manure, only an average yield of 5 bags per acre for the last two years were obtained, while on Section B, to which basic slag followed by sulphate of ammonia had been applied, an average yield of 6 bags per acre was obtained in 1900, and of $8\frac{1}{4}$ bags per acre in 1901. This would seem to indicate that the latter method of manurial treatment is the one most likely to prove successful in renovating old and neglected cacao trees on red clay lands in the interior of the island. Several visits were paid by the Agricultural Instructor to the holdings of peasant cultivators and, where possible, practical demonstrations were given in budding oranges and other plants. Efforts are also being made to encourage the cultivation of limes in localities unsuited for the growth of cacao, and allusion is made to an interesting experiment in reforestation at present being carried on by the Hon. W. H. Lascelles near the Grand Etang Lake.' The trees which consist of the native 'gommier' *(Dacryodes hexandra)* planted 4ft. apart either way, are now two years old and are described as 'being from two to two-and-a-half feet high and growing well.'

West India Isinglass. There is observed in Messrs. Hales Caird & Co.'s Market Reports of the 5th inst., a quotation for Isinglass as follows :—'Isinglass, West India firm—Nine packages offered and sold, darkish to fair pale lump at 1*s.* 11*d.* to 2*s.* 4*d.* ; purse—thin to fair 10*d.* to 1*s.* 2*d.* per lb.' It would be interesting to learn the origin and nature of the product above quoted. In other words : what is 'West India Isinglass.'?



TRINIDAD: BULLETIN OF MISCELLANEOUS INFORMATION, JULY 1902. Edited by Mr. J. H. Hart, F.L.S.

Mr. Hart has continued the publication of this quarterly Bulletin for several years, and he deserves great credit for the time and attention devoted to it. The present number is fully equal to its predecessors and contains a mass of information of a useful character. It is recorded that a slight quantity of the dust from the recent volcanic eruptions fell at Trinidad and the sky line was obscured by a thick fog. The seismograph at the St. Clair Station registered only 'small disturbances.' Mr. Hart states that, as the result of the comparatively small experiments with seedling canes at St. Clair, 'the Barbados Seedling B. 208 stands at the head of the list for sugar contents as grown side by side with the Trinidad varieties.'

STRAITS SETTLEMENTS: AGRICULTURAL BULLETIN.

This is a comparatively new monthly publication edited by Mr. H. N. Ridley, M.A., F.L.S., Director of Botanical Gardens and Forests in the Straits Settlements.

It contains interesting notes on the cultivation of rubber and gutta percha trees, timber trees and other important economic productions of the far East. In the number for June, 1902, Mr. Ridley discusses plants yielding volatile oils likely to be remunerative in the Straits and Federal Malay States. The trade and market reports, as also the meteorological reports are useful features of this Bulletin.

LE CACAO, SA CULTURE ET SA PREPARATION. By Dr. Paul Preuss. Augustin Challamel, Paris, 1902.

This work consists of an extract, in French, of a larger treatise by Dr. Preuss entitled *Expedition nach Central und Süd-Amerika*, and deals solely with the growing and curing of cacao. In its present form it will no doubt be more accessible to West Indian readers than in the fuller German edition.

As the local practice both as regards cultivation and curing vary a good deal in various parts of tropical America, the author treats the subject under the various localities visited. Thus there are separate chapters on cacao in Surinam, Trinidad and Grenada, Venezuela, Ecuador and Central America. The work is well printed and illustrated and forms a most valuable contribution to the literature of the subject. All interested in cacao whether as planters or as experimenters, should find time to study this work so as to obtain a comprehensive view of the present condition of cacao culture in the New World.

FEEDS AND FEEDING—A HAND-BOOK FOR THE STUDENT AND STOCKMAN. By Professor W. A. Henry, *Director of the Wisconsin Agricultural Experiment Station.*

During late years a large number of experiments on the feeding of animals have been carried out at the Experiment Stations of the United States, Germany and elsewhere, the results of which are to be found in the numerous bulletins issued by these Stations. For the most part they are inaccessible to the general public. The need therefore of a modern work on the subject in which all these results are collected and set out in such a manner as to appeal to the practical man is evident. It is to fill this distinct gap in the literature of the subject that the author has put forward the volume before us, a work of more than 600 pages.

The book is divided into three parts,—animal nutrition, feeding stuffs, and the feeding of farm animals, the two former being of more immediate interest to the student than the farmer. In the section dealing with feeding those portions concerning the horse and dairy cow will probably be of greatest use to West Indian readers. It is interesting to note that the American experience as to the value of condiments in stock feed is negative, no advantage in their use being shown in the experiments. We cordially recommend this volume to all interested in stock in these Colonies as a valuable work of reference for the practical agriculturist. It should also find a place in the various public libraries in the West Indies. We may add that the work is published by the author at Madison, Wisconsin, United States of America, at $2.00 per copy.

ST. VINCENT SOUFRIÉRE.

We have received from *The Times* Printing Office, St. Vincent, a small pamphlet containing 'An account of the Eruptions of the St. Vincent Soufriére (with wood cuts) by Mr. P. Foster Huggins.' This is an interesting record of the events that accompanied the eruptions of 1812 and 1902 with, in addition, a table of soundings in the crater lake in 1896 and 1900 and two diagrams showing sections through the Soufriére mountain from East to West.

TROPICAL AGRICULTURIST.

This 'Monthly Magazine of information regarding products suited for cultivation in the Tropics' has just completed its twenty-first year. It is published at the *Observer* Office Ceylon, and is one of the best known publications devoted to tropical agriculture. We heartily congratulate Messrs. Ferguson on their long-continued and successful efforts to assist planting industries in the tropics.

Insect Moults. Insects on hatching from the egg are very small and grow in size as they become older. The outer skin being only elastic to a certain extent does not allow of a great growth in size, and so has to be periodically shed as the size of the body increases. This operation of skin-casting is generally known as moulting. The whole of the harder outer layer of the body is thrown off, together with the lining of the air tubes and the alimentary canal. The insect then emerges with a white soft skin which allows for a certain amount of expansion. The number of moults during the life of an insect is very variable in different species, amounting in some to as many as twenty-five. More generally the number lies between four and eight, but is dependent on a variety of conditions.

EDUCATIONAL.

Examinations of Agricultural Schools.

The half-yearly examinations in theoretical and practical subjects of the pupils of the Agricultural Schools at St. Vincent, St. Lucia and Dominica have recently been held.

The questions were drawn up under the direction of the Commissioner of Agriculture and forwarded in sealed packets to the presiding officers in each case.

ST. VINCENT.

Nine boys,—Glasgow, McMaster, Carr, Trotman, Thomas, Wright, Derrick, H. Browne and Haynes were placed in the First Rank, and fifteen boys,—D. Browne. Warner, Placid, Olivierre, Yorke, Durrant, George, Ramirez, Yearwood, Rankin, Lougheed, Byam, Edghill, Cordice and Peters in the Second Rank. In Agriculture and Botany the examiner reports that more than one-half the boys scored high marks. In some cases weakness was shown on the practical side. In Chemistry seven candidates sent up good papers. In Arithmetic, Composition and Geography the examiner recommends that the examples should, in every case, have a practical trend and refer to matters closely associated with the daily life of the planter.

ST. LUCIA.

As this school was only opened in October 1901, it is not possible to draw more than general conclusions from the examinations just held. One boy, Demay, was placed in the First Rank and Flavien and Goring at the head of the Second Rank. The examiner reports that the answers in Agriculture, Botany and Chemistry were on the whole fairly accurate; but the standard of attainment generally, was lower than at the St. Vincent and Dominica schools.

DOMINICA.

Eleven boys were placed in the First Rank:—H. D. Shillingford, Elwin, Serrant, Nicholas, Leslie, Watty, Rolle, Alleyne, Etienne, Winston, and Wayland; and nine boys in the Second Rank:—Richards, Green, Josse, Bruney, Lawrence, P. Shillingford, Gachette, La Rocque, and Theodore.

The examiner reports that in Agriculture the practical questions were very well answered and the results reflect great credit on the teacher. The bearing of the elementary facts of botany on agriculture had been well grasped by many of the pupils. The answers in Chemistry were not so good as in the preceding subjects. Arithmetic was weak and Composition fair. The most satisfactory feature of the Dominica school was the effort that had evidently been made to render the indoor studies of real value to the students in after life.

The next half-yearly examination of the pupils at the Agricultural Schools will be held in December next.

Jamaica.

Agricultural Instruction to Teachers.

In a previous number of the *Agricultural News* (p. 75) attention was drawn to the forthcoming course of practical instruction in agriculture to teachers at the Mico Training College, Kingston, Jamaica. A large number of teachers have arranged to attend the course.

The Time Table is as follows:—

DAILY—MONDAY TO FRIDAY.

7-9.30 a.m.—Practical work at Hope Gardens under Messrs. Cradwick and T. J. Harris.

11-11.45 a.m.—Lecture on elementary physics and chemistry, or on animal life, by Mr. Buttenshaw.

12-12.45 p.m.—Lecture on plant life and growth, by Mr. Buttenshaw.

1.15-2 p.m.—Lecture on soils, by Mr. Buttenshaw.

SATURDAY.

Practical work at Hope as usual: writing up notes; book study.

ADDITIONAL LECTURES.

On three afternoons each week (Tuesday, Thursday and Friday) Lectures on special subjects will be given as follows commencing at 4.30 p.m.:—

July 22, Tuesday: The fertility of the soil, H. H. Cousins, Esq.

July 24, Thursday: The preparation of produce for market, C. E. deMercado, Esq.

July 25, Friday: Bee-keeping, H. C. Burnet, Esq.

July 29, Tuesday: Cultivation of pine-apples, C. Eugene Smith, Esq.

July 31, Thursday: Cultivation of citrus plants, Hon. T. H. Sharp.

August 1, Friday: The relations of teachers to the general agricultural development of the Island, 4 p.m., His Grace the Archbishop.

August 1, Friday: Bee-keeping, H. C. Burnet, Esq.

August 5, Tuesday: Dairying, C. A. T. Fursden, Esq.

August 7, Thursday: How Jamaica was made, His Excellency the Acting Governor.

August 8, Friday: Grape vines, Rev. W. Griffith.

August 12, Tuesday: Co-operation of the farm, J. T. Palache, Esq.

August 14, Thursday: How to make the most of small holdings without borrowing capital, Hon. H. Cork.

August 15, Friday: Recent changes in the Code, Hon. T. Capper.

The afternoon lectures will be open to the public, but seats will be specially reserved for the schoolteachers.

In addition to the foregoing courses Mr. Peet and Mr. Skyers will hold evening classes in Manual work as prescribed in the Code.

It is gratifying to note that in Jamaica the value of Agricultural Education is appreciated to such an extent that at the teachers' courses some of the leading personages of the island attend and give addresses, in addition to the regular lecturers.

Stock at the Agricultural School, Dominica.

Mr. David Tannock, the Officer-in-charge, reports an increase in the stock kept at the Agricultural School, Dominica, by the introduction of the following animals by the Imperial Department of Agriculture, namely, three Tamworth pigs, (one boar and two sows) purchased from the Government Farm, Trinidad; five woolless sheep, (four rams and one ewe) of a breed highly appreciated in Barbados; also a trio of Pekin ducks, from the Government Farm, Trinidad. The pigs will be kept and bred pure, as in the case of the Poland China breed already at the school, and the young ones sold to planters and stock-keepers in the island. The Tamworth pigs are reddish-brown in colour. This is probably the first introduction of animals of this breed into Dominica, and it will be interesting to note if they thrive as well as the black Poland China and Berkshire.

MONTSERRAT: REPORT ON THE EXPERIMENT STATIONS, 1900-1901. By Mr. A. J. Jordan, Agricultural Instructor.

The report is on the whole of a very favourable character. Notwithstanding the severe drought experienced during the year and the many difficulties encountered in starting agricultural work of this kind in the West Indies, substantial progress has been made and the Experiment Stations at Montserrat are now actively engaged in furthering the agricultural interests of the island. Plants and packages of seeds to the number of 37,864 were distributed from the Station during the period reviewed; and in addition to these a large quantity of English potato and yam plants, purchased from Relief Funds were distributed to 115 peasant proprietors and others resident in the island.

Two Agricultural Shows were held. These were supported by grants contributed by the Imperial Department of Agriculture and were well attended. Amongst the more interesting exhibits were some English potatos and onions. There was keen competition in most of the classes, especially those for starches and provisions. Two courses of lectures were given to the school teachers by the Travelling Superintendent of the Department. These were attended by seventeen and twenty-one teachers respectively, and were much appreciated. Bee-keeping is progressing favourably: an apiary is being formed at each of the Experiment Stations and a stock of bee-keepers' supplies is kept on sale at the Grove Station.

ASSOCIATION OF OFFICIAL AGRICULTURAL CHEMISTS. Proceedings of the Eighteenth Annual Convention, held at Washington, D.C., in Nov. 1901. Bulletin 67, Bureau of Chemistry, U.S. Department of Agriculture.

For nearly twenty years it has been the custom of the Official Agricultural Chemists in the United States to meet annually for the purpose of discussing methods and results, and of organizing research with the view of improving the processes employed in chemical analysis. The result of these conferences are published every year by the Department of Agriculture and should find a place in the working library of every chemist in the West Indies.

In the bulletin under review, the subjects which came up for discussion are very numerous and include many problems in the analysis of manures, foods and feeding stuffs, and the sampling and analysis of soils.

The remarks of the President of the Convention on the manner in which conference papers should be delivered are deserving of notice. They should consist of sharp, clear and comprehensive statements of results so expressed that all present should hear and understand them. Scientific training is described as 'a training in clear, thorough, precise statement, accurate observation, the verification of evidences and the ascertainment of truth.'

DEPARTMENT NEWS.

The Secretary of State for the Colonies has appointed Dr. Morris, C.M.G., Imperial Commissioner of Agriculture for the West Indies, to attend the International Plant-Breeding and Fertilization Conference to be held at New York on September 30 and October 1 and 2 next.

The Secretary of State for the Colonies has appointed Mr. L. Lewton-Brain, B.A., late Foundation Scholar at St. John's College, and Hutchinson Student for research in Botany, in the University of Cambridge, to the post of Mycologist and Lecturer in Agriculture on the staff of the Imperial Department of Agriculture for the West Indies, in succession to Mr. Howard, B.A., F.L.S., F.C.S., whose term of service expires on September 17 next.

Professor J. P. d'Albuquerque, M.A., F.I.C., F.C.S., Chemist-in-charge of Sugar-cane Experiments at Barbados under the direction of the Imperial Department of Agriculture has been granted an extension of leave of absence for two months and four days from August 24.

It is in contemplation that Mr. J. R. Bovell, F.L.S., F.C.S., the Agricultural Superintendent in charge of the Sugar-cane Experiments at Barbados, under the direction of the Imperial Department of Agriculture in the West Indies, will give an address before the Barbados Agricultural Society on or about September 12 next. The address will contain some of the results of the sugar-cane experiments for the crop season 1900-1902. A summary will afterwards be published in Pamphlet form for the information of the planting community.

STOCK AND AROMATIC GRASSES.

A suggestion was made on page 105 of the *Agricultural News*, that the aromatic principle in the Barbados sour-grass might be of value in warding off ticks, etc., from animals. In this connexion Mr. C. W. Meaden, Manager of the Government Farm, recounts the following experiment made to determine whether such grasses had any effect on the milk of cows eating them: A single cow was stalled and fed entirely on an aromatic grass (known in Trinidad as 'sour grass,' but not the Barbados sour-grass). The milk was tested twice daily and no change was observed either in taste or smell. If it should be definitely proved that the aromatic grasses are of direct use in warding off the attacks of ticks, etc., it is of interest to know that they have apparently no influence on the character of the milk. Further observations on this head would be welcome.

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—August 5, 1902.—Messrs. J. Hales Caird & Co., Messrs. Gillespie Bros. & Co. and The Public Ledger, July 19, 1902.

Aloes—Curaçoa 10*s* to 43*s*; Barbados 13*s* to 35*s* per cwt.
Arrowroot—St. Vincent, good to fine 2¾*d* to 4*d* per lb.
Balata—2/4½ per lb.
Bees-wax—Jamaica, fair to good pale £7 17*s* 6*d* to £8. per cwt.
Cacao—T'dad, good red 65/- to 67/- ; fine 68/- to 71/- ₱ cwt.
Dominica 57/- to 58/- per cwt.
Grenada, good to fine 59/6 to 64/6 per cwt.
Jamaica, fair to good 56/- to 61/- per cwt.
Cardamoms—Mysore, 1/- to 3/- per lb.
Cassia Fistula—5/6 to 35/- per cwt.
Castor Oil—4½*d* to 4¾*d* per lb.
Coffee—Jamaica, ordinary pale mixed 32/6 ; fine coloury @ 75/6 per cwt.
Costa Rica, 41/- to 72/- per cwt.
Peaberry, 60/- per cwt.
Cotton– Carriacou, 4½ to 5*d*. per lb.
Cowage—1*d* to 2*d* per lb.
Fustic—Little demand. Small sales @ £5 ₱ ton.
Ginger—Jamaica, fine bold 56/- ; ordinary to good ordinary 38/- to 41/- per cwt.
Honey—Pale reddish 18/- ; brownish red 17/- ; pale dull 15/- to 16/- per cwt.
Jalap—4*d* to 6*d* per lb.
Khus-Khus Root—12/- per cwt.
Kola Nuts—1*d* to 4*d* per lb.
Lime Juice—Raw, 1/3 per gallon ; concentrated, £12. 10*s*. per pipe.
Logwood—No quotations.
Mace—1/2 to 1/10 per ℔.
Nitrate of Soda—Agricultural £8 17*s*. 6*d*. per ton
Nutmegs—146's to 80's, 5*d* ; 80's 1/1 to 1/3 ; 66's, 2/1 to 2/3 ; in shell 4½*d* per lb.
Oil of Limes—no quotations.
Pimento—2¾*d*. per lb.
Sarsaparilla—Jamaica fair 1/3 per lb.
Sugar—Muscovado 11/3 to 12/3 duty paid ; crystallized 12/6 to 14/6 per cwt.
Sulphate of Ammonia—Grey, 24 per cent., London £12 2*s* 6*d* per ton.
Tamarinds—11/6 to 14/- per cwt.
Tonquin Beans—9*d* to 2/6*d* per lb.
Fruit—Covent Garden Market (Gardeners' Chronicle, August 2, 1902.)
Bananas—7/- to 12/- per bunch.
Lemons—13/- to 30/- per case.
Mangos—4/- to 6/- per dozen.
Oranges—12/- per case.
Pines—4/- to 6/- each.

Halifax N. S.—The Maritime Merchant July 31, 1902.

Lemons—4.00 per case
Molasses—Porto Rico 30c. to 31c., Barbados 24c. to 25c. per gallon.
Pine Apples—$2.00 per dozen.

New York,—Aug. 8, 1902.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaica, 9 hands $1.00 to $1.10, 8 hands 75c., 7 hands 45c. per bunch.
Cacao—African 12¾c. to 13c. ; Caracas, 13¾c. to 14½c. ; Jamaica, good ordinary 11c ; good fermented 12c. Grenada 13c. to 13½c. Trinidad 13c. to 14c. per lb.
Cocoa-nuts ; Small Trinidads $12.00 to $13.00 ; Jamaicas $21.00 to $23.00 per M.
Coffee—Rio, good ordinary 5¾c. ; Jamaica good ordinary 6c. to 7c. per lb. ; Manchester grades 9c. to 11c. per lb.
Ginger—8c. to 8½c per lb.
Pimento—5½c per lb.
Rubber—Nicaragua Scrap 49½c. per lb ; sheet 43c. to 45c. per lb. ; Guayaquil Strip 47½c. per lb.
Sugar—Muscovado, 89°, 2⅝c. to 2⅞c. ; Centrifugals, 96°, 3⅜ per lb.

INTER-COLONIAL MARKETS.

Antigua,—August 13, 1902.—Messrs. G. W. Bennett, Bryson & Co., Ltd.

Molasses—9c. per imperial gallon, package included.
Sugar—Muscovado $1.10 per 100lb., nominal.

Barbados,—Aug. 16, 1902.—Messrs. T. S. Garraway & Co., and Messrs. J. A. Lynch & Co.

Arrowroot—good quality, $3.50 per 100 lb.
Cacao—$13.50 per 100 lb.
Coffee—Jamaica and ordinary Rio $8.50 and $9.50, per 100 lb. respectively.
Hay—New Brunswick 90c. per 100 lb.
Manures—Nitrate of Soda $60.00 per ton ; Ohlendorff's Dissolved Guano ; $60.00. Sulphate of Ammonia $80.00; Sulphate of Potash $70 per ton.
Molasses—No quotations.
Onions—Madeira $4.00 per 100 lb.
Potatos—$3.00 to $3.50 per 160 lb.
Rice—Ballam $4.60 per bag ; Patna $3.75 per bag ; Rangoon $3.00 per bag.
Shalots—12c. to 14c per lb.
Sugar—No quotations.

British Guiana,—August 14, 1902.—Messrs. Weiting & Richter.

Arrowroot—$8.00 per barrel.
Cacao—native 11c. to 12c. nominal.
Cassava Starch—$8.00 per barrel.
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica 11c. to 12c. per lb. (retail.) Creole, 11c. to 12c. per lb.
Eddoes—$1.20 per bag.
Onions—bulk sold at 4c. per lb.
Pea Nuts—Curaçoa 3¾c. ; American 4½c. (retail.)
Plantains—20c. to 48c. per bunch.
Potatos English—$4.00 per barrel.
Rice—Ballam $4.80 to $4.90 ex store; Patna $5.90 to $6.00 per bag—Creole Rice 20c. per gallon, (retail.)
Sweet Potatos—Barbados $1.68 per barrel.
Tannias—$1.68 per bag.
Yams—$4.00 per bag.
Molasses—Vacuum Pan yellow 14½c. to 15c. per gallon, casks included.
Sugar—Dark Crystals $1.60 ; yellow $2.10 per cwt.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—August 14 & 15, 1902.—Messrs. Gordon Grant & Co. and Messrs. Edgar Tripp & Co.

Cacao—Ordinary to good red $13.00 to $13.25 ; estates $13.50 to $13.75 per cwt.
Balata—no quotations.
Coffee—Venezuelan. No quotations.
Onions—$1.20 to $1.25 per 100lb.
Potatos English—$1.50 to $2.00 per 100lb.
Rice—Yellow $4.75 ; White Table $5.50 per bag.
Sugar—For Grocery use, $1.70 to $3.00 per 100lb.
Molasses—No quotation.

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HEVEA BRASILIENSIS. Coming crop of seeds August-September shipment. As orders must reach us at least at the end of July to avoid disappointment, ordering by wire necessary on the appearance of this advertisement. There is only one crop in the year. A leading Sumatra planter who purchased 150.000 seeds on two previous occasions writes under date May 10, 1902 : 'I shall like to have your lowest terms for delivery of 100,000 Hevea seeds in the same way as before from the coming crop.' 75% guaranteed to germinate. Shipments to West Indies can be made to London only : re-shipment must be arranged by purchasers.

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A Foreign Agricultural Department writes dating 9th September, 1901 :—"Please accept our order for 175 lb. of Tea seed and for 2,000 Coffee beans. In regard to Coffee seed I would say that this will be the first importation made by this Department, and we will leave the selection of the varieties to be sent to your judgement."

"SOUTH AFRICA."—The great authority on South African affairs of 25th March, 1899, says :—An interesting Catalogue reaches us from the East. It is issued by William Brothers, Tropical Seed Merchants of Henaratgoda, Ceylon, and schedules all the useful and beautiful plants which will thrive in tropical and semi-tropical regions. We fancy Messrs. Williams should do good business, for now that the great powers have grabbed all the waste places of the earth, they must turn to and prove that they were worth the grabbing. We recommend the great Powers and Concessionaries under them to go to William Brothers."

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Total Assurances Issued	$11,752,403
Total Bonuses Declared (31 December 1900)...	3,610,921
Sums Assured and Bonuses Existing	5,154,157
Total Claims by Death and Matured Endowments	5,375,545
Life Assurance Fund	2,118,650
Annual Income	245,345
Net Surplus December (31 1900)	297,124

The Premiums are Lower than those charged by other Life Offices doing business in the West Indies.
The Bonuses declared have not been equalled by any other Assurance Society in the world.
Its Policy Contracts are Liberal, Fair and Equitable.
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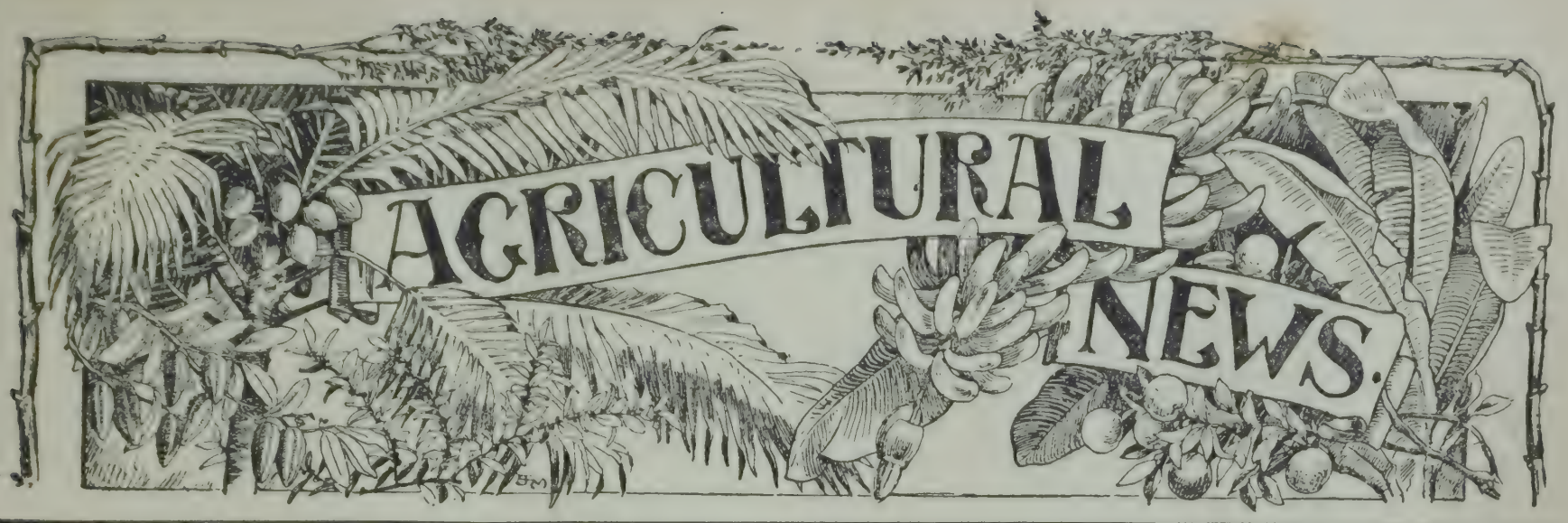
All the profits belong to the Policy-Holders.

May 22, 1902.

H. J. INNISS,
Secretary.

Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.



A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

Vol. I. No. 11. BARBADOS, SEPTEMBER 13, 1902. Price 1*d.*

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Sugar-Cane Experiments.

THE detailed Report on the Sugar-Cane Experiments for 1899-1901 carried on at Barbados, under the direction of the Imperial Department of Agriculture, has recently been published. This consists of a bulky volume of 178 pages containing a mass of valuable information relating to seedling and other canes and manurial experiments. The Demerara *Daily Chronicle* reviews this report as follows:—

'In the covering letter Messrs. Bovell and d'Albuquerque explain that the work was conducted at Dodds Botanic Station and at thirteen plantations situated in different typical localities of the island. The experiments, they add, involved the growth, reaping and analysis of about 1,000 plots of canes. The volume before us is thus an illustration of the zeal and industry with which the Barbados scientists are prosecuting their arduous inquiries in behalf of the West Indian sugar industry. As the head quarters of the Imperial Department of Agriculture, it is significant that within the past few years Barbados should have taken the leading place in that branch of research which had its origin in the island—the raising of new species of canes by germination. There can be no doubt that this important botanical discovery is destined to prove of real economic value in connexion with the cane-sugar industry. The returns contained in the report are most exhaustive; and of all the varieties experimented with, it is again a seedling, B. 208, which holds the premier place. Though this new variety heads the list for the first time, it is a cane which has already given satisfactory results in the island, and its characteristics, so far as its cultivation in Barbados goes, may thus be said to be fixed and reliable. The actual results of these experiments were published in December, last, in an epitomized form and have already been reviewed in these columns. In the report under notice detailed

analytical and statistical tables are presented setting forth the results to the fullest extent. As is well known, the seedling variety B. 147 has been deposed from its former position in the list of canes experimented with—a circumstance which seems to be due chiefly to the unfavourable weather conditions. . . . . The seedling B. 208 is for the moment in favour, and, as we have said, it seems to stand the test of local conditions. Though the records of a single year may, as Dr. Morris has observed, be "necessary evils" in connexion with these experiments, we may note that B. 208 appeared high on the list in the report for 1900 and displayed the same essential characteristics as those which distinguish it in the latest report. Thus, its juice in 1900 was richer and purer than that of B. 147, and the advantage denoted is accentuated in the returns before us. B. 208 is described by the compilers of the report as the best all-round cane for the season 1901, "taking into account its ready germination, the general absence of disease, the yield of sugar, the great richness and purity of its juice, and the satisfactory results obtained in both black and red soils, plants and ratoons." The average indicated muscovado sugar yield of this seedling was 2·6 tons per acre. "The juice was highly suitable for the muscovado factory, and was so rich and pure that the canes could safely be mixed with others not so rich and pure in order to enable the planter to make a better class of sugar." It is a hardy, drought-resisting species, and according to the experimenters it "deserves careful trial to the extent of a few acres on every estate." The White Transparent cane, which is used as a standard, has always taken a high place in these experiments. "The expressed juice was fairly rich and moderately pure. It required care in the boiling-house to ensure in all cases the making of good muscovado sugar." In order of yield it stands fifth on the red soils, but taking the average of all plots it comes second on the list, the muscovado yield being 2·5 tons to the acre. A variety closely resembling the White Transparent in appearance and behaviour is the Jamaica cane, which has acquitted itself well on both black and red soils. The Sealy seedling, on the whole, has given disappointing results, the juice being poor. Other species of canes, including the Rock Hall cane, D. 130 and D. 145 were tested in the course of the year, but the results were so unsatisfactory, either on account of the small tonnage of canes or the inferior juice, that it is not proposed to continue their experimental cultivation. These failures will be replaced by newer seedlings and imported varieties, and the scientists intend also to extend the cultivation of three or four of the best canes to a small estate scale of one acre plots planted in duplicate. On the whole, though the unpropitious season has served to disturb the belief of the planters in the variety which headed the list for two successive years, it has in no way shaken the confidence of the public in the value of these experiments and the correctness of the methods by which they are conducted. The manurial experiments are in themselves of considerable importance, and the details show the relative results arising from the application to cane cultivation of phosphates, potash, nitrogenous and other chemical manures.'

TRAINING FOR AGRICULTURAL STUDENTS AT JAMAICA.

The Board of Agriculture of Jamaica has recently approved of a scheme, under which provision is made for the practical training of agricultural students at the Government Laboratory, Jamaica. Mr. H. H. Cousins, the Government Chemist gives instruction in practical chemistry and physics, and agricultural chemistry and sugar production. The Hon'ble W. Fawcett, Director of Botanic Gardens, has promised to lecture on the 'Economic Plants' of Jamaica. Mr. Buttenshaw, the Lecturer in Agricultural Science for Jamaica, lectures on general agriculture, chemistry, botany, physics and book-keeping. Mr. J. J. Harris of the Botanic Department, Jamaica, has charge of agricultural botany, and Mr. H. S. Hammond, assistant to the Government Chemist, of practical botany, economic entomology and mensuration.

The *Gleaner* of Jamaica, says:—

The course begins on October 1. There are two classes of students; regular students and occasional students, the first being those who wish to become experts in the branches they study, or who desire to gain a thorough knowledge of agricultural science; and the others being those who wish to attend short courses and get some scientific knowledge of the principles underlying their work in field and works. The candidates must be over 16 years of age, and must satisfy Mr. Cousins (the Government chemist,) that they are fit and desirable persons to undertake the work. This is to be done, if necessary, by examination, the standard of attainment being the Junior Cambridge Local Examination. The regular students are to pay a fee of £4 per term but provision is made for a number of free students. The normal length of a course is to be two years. An important part of the instruction will be that dealing with the production of rum, a specialist on which will, it is hoped, be shortly obtained from England to devote himself to the subject. It shows that a good deal of work is packed into a week, and the students will have to work hard. But if they do, they will issue from the college with an equipment which will make them qualified to take a responsible position in the country. Jamaica has now facilities for turning out well-trained agriculturists which have previously only existed abroad. Should these be steadily taken advantage of we may look forward to substantial economic advancement in the future. The influence of the work will not be restricted to those who have studied; it cannot fail to tell on others when the knowledge is put into practice. The general mass of the people learn more by example than precept, and everything that is being done in the direction of higher agriculture is having its effect on their mind and effort.

SUGAR CROPS OF BARBADOS, 1882-1902.

Some weeks ago Mr. J. R. Bovell, the Agricultural Superintendent of the Sugar-cane Experiments forwarded a memorandum on the sugar and molasses crops of Barbados for the four years 1899 to 1902 inclusive *(Agricultural News*, p. 131*)*. Since then Mr. Bovell has prepared a further memorandum of the sugar and molasses crops for the past twenty-one years.

The principal point in connexion with these figures is the fact that whereas twenty-one years ago the planters of Barbados obtained a profit of nearly £11, they now sustain a loss of about £4 for each ton of sugar and its molasses.

Sugar and Molasses crops of the island of Barbados for the 21 years 1882 to 1902 inclusive.

Year.	Average price at which sugar sold per 100 lb.	Average price at which molasses sold per gallon.	Market value of 1 ton of sugar and 100 gallons of molasses.			Cost of producing 1 ton of sugar and 100 gallons of molasses.			Gain per ton of sugar and 100 gallons of molasses.			Loss per ton of sugar and 100 gallons of molasses.		
			£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
1882	$3.80	25½ cents	24	17	2½	14	0	0	10	17	2½		——	
1883	$3.75	23 ,,	24	2	1½	14	0	0	10	2	1½		——	
1884	$2.55	14½ ,,	16	14	8½	14	0	0	2	14	8½		——	
1885	$2.30	10½ ,,	14	14	8½	13	0	0	1	14	8½		——	
1886	$2.00	12½ ,,	13	15	0½	13	0	0	0	15	0½		——	
1887	$2.05	11½ ,,	13	15	6½	13	0	0	0	15	6½		——	
1888	$2.45	14½ ,,	16	5	4½	12	8	7	3	16	9½		——	
1889	$3.02	18 ,,	19	12	9	12	8	7	7	4	2		——	
1890	$2.30	13½ ,,	15	7	2½	12	8	7	2	18	7½		——	
1891	$2.45	17½ ,,	16	17	10½	12	8	7	4	9	3½		——	
1892	$2.20	13½ ,,	14	17	10½	12	8	7	2	9	3½		——	
1893	$2.65	13½ ,,	16	19	10½	12	8	7	4	11	3½		——	
1894	$1.92½	11 ,,	13	1	9½	12	8	7	0	13	2½		——	
1895	$1.60	13 ,,	11	19	9½	12	8	7		——			8	9½
1896	$1.97½	12½ ,,	13	12	8½	12	8	7	1	4	1½		——	
1897	$1.58	6¾ ,,	10	11	10½	12	8	7		——		1	16	8½
1898	$1.66	9 ,,	11	8	8½	12	8	7		——			19	10½
1899	$2.07	13 ,,	14	3	8	12	8	7	1	15	1		——	
1900	$2.11	16½ ,,	15	1	11½	12	8	7	2	13	4½		——	
1901	$1.70	10½ ,,	11	18	8½	12	8	7		——			9	10½
1902	$1.06	7¾ ,,	8	7	6½	12	8	7		——		4	1	1

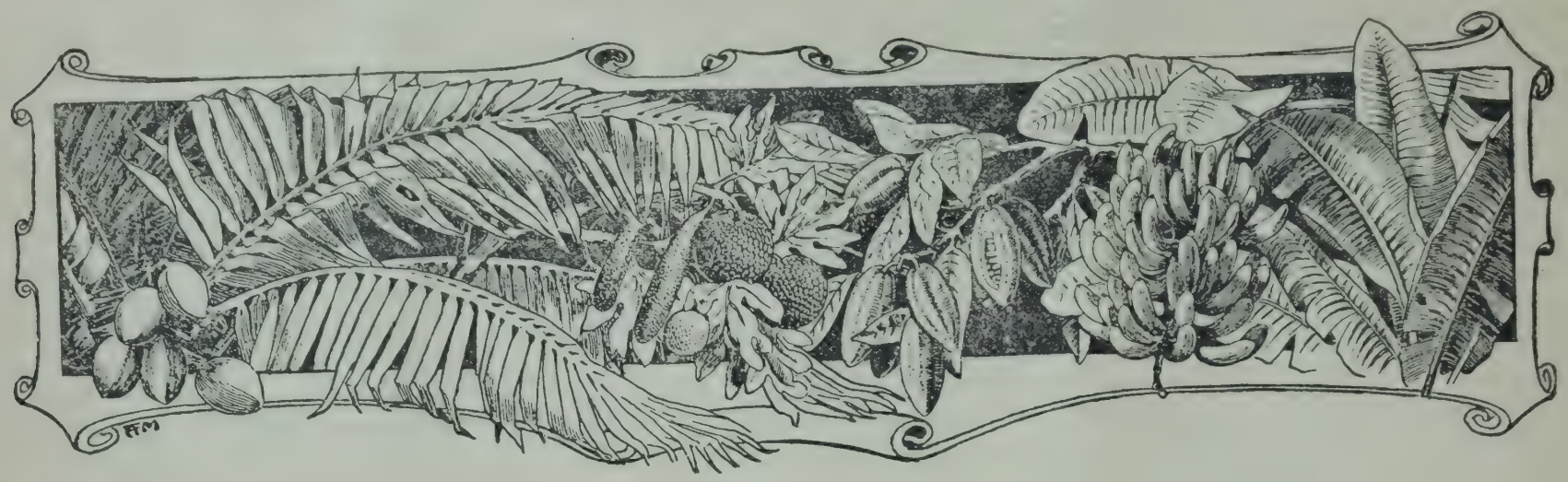
The data for the cost of production of sugar and molasses from 1882 to 1887 has been obtained from only a few estates. The cost from 1888 to 1897 is based on data obtained from many estates situated in all the districts of the island. These amounts should include the cost of a ton of sugar and its 100 gallons of molasses, and also the value of the hogshead and puncheon.

The average price at which sugar and molasses sold from 1882 to 1896 is taken from a return prepared for the Royal West India Commission and is the mean of the highest and lowest prices in each year. From 1897 to 1902 the prices are the mean of the bi-weekly prices at which sugar and molasses sold during each year's crop season.

Abnormal Indian Corn. The Indian corn or maize usually bears its male and female flowers on distinct portions of the plant. The males form the terminal branched tassel, whilst the female flowers are borne lower down and are indicated by the well-known 'silk' of the young cobs. An interesting example was recently forwarded to the Department by Mr. W. Walcott of the Pine estate, Barbados, in which the terminal inflorescene was mixed, consisting of a small cob, bearing normal, nearly ripe corn, surrounded by about a dozen spikes of ordinary male flowers, such as comprise a normal tassel. Three other examples of this phenomenon have also recently been seen in Barbados, and one was reported from Trinidad. Dr. Maxwell T. Masters states in his well-known book on *Vegetable Teratology* that the phenomenon is known to occur now and then in the maize plant in various parts of the world.

Tick Dip.

The Agricultural Department of Natal after many trials, have decided on the following as a standard dip. It is a modification of Christian's, which was always found the most effective, and is most destructive to tick life, even affecting the parasite in the larval stage. The ingredients are—arsenic, 8lb ; caustic soda, 4½lb. ; tallow, 8lb. ; Stockholm tar, 2½ gallons to 400 gallons of water.



WEST INDIAN FRUIT.

BANANAS FOR THE BRITISH MARKET.

The following interesting letter has been addressed to the Secretary of State for the Colonies by Mr. A. C. Stewart, the Government Emigration Agent for Jamaica, at Calcutta. It is singular that while this Department has been strongly advocating the claims of the Chinese or Dwarf banana (that is, the Canary banana) for cultivation in the Lesser Antilles, Mr. Stewart is prepared to recommend that this banana, well known throughout the West Indies, should be grown at Jamaica as well as the *Gros Michel* banana, in order, as he states, that Jamaica may have two strings to its bow. Mr. Stewart's letter is as follows:—

London, July 19, 1902.

I have the honour to submit for the consideration of the Right Honourable the Secretary of State for the Colonies the following remarks regarding the Banana Trade of Jamaica, in the hope that the point to which I venture to draw attention in its interests may be thought of sufficient importance to warrant the forwarding of this letter to the authorities in the West Indies.

2. I have now been in this country on leave of absence for nearly four months, staying in different parts of England and Scotland. Wherever I have gone I have made it my practice when visiting fruiterers' shops to make inquiries as to the demand for bananas. I regret to state that in almost every case a preference has been expressed for the variety imported from the Canary Islands.

I think I may say that I have had a very wide experience of the fruit, having lived in both the East Indies and the West Indies. Personally, of the two, I prefer the Canary banana and I find this preference shared very largely by persons who have resided in the tropics. I believe I am also right in saying that the Canary banana commands a readier sale in the Covent Garden Market. It may be urged that the Jamaica banana appeals to a different class. I understand that this is the case, but, so far as my experience goes with the Jamaica banana, this is a lower class. It is sold very largely on street barrows and fetches retail a lower price than the Canary banana, which in its turn appeals to a better class.

My suggestion is not that the variety now grown in Jamaica should be entirely replaced by the Canary variety. What I feel is this: firstly, that the better article will always command the market in the long run, and secondly, that it is admitted that there is a large demand for the Canary variety. I, therefore, consider that it would be wiser for Jamaica to meet the public taste and to grow both varieties, so having two strings to its bow.

I have not seen the Canary banana actually growing, but I believe it to be nearly identical with the dwarf variety grown in Trinidad under the name of 'Governor Fig' and known in India as 'Kabuli Kela'—*Musa Cavendishii*. This variety produces large well-shaped bunches, and, owing to its less luxuriant habit, would probably be found less exhausting to the soil, while it certainly withstands strong winds better. In any case it would not be difficult to make the experiment, if necessary, obtaining some suckers of the Canary variety.

3. I do not claim that the Canary banana is the best that can be grown. In my own garden in Calcutta I grow at least five varieties, two introduced by myself from Fiji and three indigenous to India—'Champa', 'China Champa' and 'Martaban', which I consider much better as regards flavour and consistency; but, as far as my experience goes they are not so profitable—both the bunches and the individual bananas are smaller, while the Martaban variety is more difficult to grow and travels badly.

4. I think also it would be worth while to make inquiries as to the varieties which are grown in Fiji for the Australian market. I am quite sure that the public will always appreciate a good article and I feel that Jamaica should try to supply the best possible rather than to rest satisfied with producing the particular variety which it may happen to have, without inquiring whether or not it is that which people here prefer and are prepared to pay for.

PACKING AND SHIPPING PINE-APPLES.

The following practical hints in respect of the packing and shipment of pine-apples from the West Indies have recently been published by Mr. H. Hesketh Bell, the Administrator of Dominica:—

(1) Exercise the greatest care in handling the fruit from the field to the packing shed. The slightest bruise at this stage involves absolute ruin to the fruit when it ripens. (2) Carefully grade your pines. Do not put large and small in the same crate. Pines weighing less than 3½ lb. are hardly worth shipping to London. (3) Pack your fruit with all possible precautions. Wrap them first in clean paper and

then liberally swathe them in dry banana trash. Be most careful to prevent the fruit from rubbing against the wood framing of the crate. Do not cram your fruit into the crates. Be satisfied to pack eight pines safely rather than ten which may arrive damaged and worthless. (4) Never be tempted to use anything else but *crates*, or, in winter, closed cases. Pines in barrels are a byword in Covent Garden market. A planter friend in Antigua, who has recently been in correspondence with me on the subject of pines which he sent to London a few weeks ago, packed, upon my recommendation, in *crates*, realized 3*s.* 3*d.* per fruit. The pines that were shipped in barrels by the same steamer, fetched 2½*d.* It is, however, only fair to say that the fruit sent in barrels were of the ordinary Antigua variety while those shipped in crates were 'Smooth Cayenne' and other specially fine kinds. The standard crates used by Florida pine-growers measure 10 by 12 by 36 inches. The materials in the 'flat' can be obtained through Messrs. Wessels & Co., Fruit Brokers of 248 Washington Street, New York. They cost from 10*d.* to 1*s.* 2*d.* each (according to quantity) landed in Dominica. (5) If possible, get early or late fruit. Pines are cheapest in London during June, July and August. During the winter they realize great prices.

BRITISH GUIANA.

Wealth of the Hinterland.

In a leading article entitled *The Untold Wealth of the Hinterland*, the Demerara *Argosy* of August 13, in reviewing a Report by Mr. Michael McTurk, C.M.G., the Commissioner of the Essequebo and Pomeroon Rivers District, for 1901-2, discusses several interesting points connected with the future development of the interior lands of the Colony. The following extracts are worthy of being placed on record:—

'There are not a few pessimists in the Colony who have nothing but mournful forebodings of the future of this land of ours; of these Mr. McTurk, is not one. Buoyant, hopeful, ever looking on the bright side of things without being unduly optimistic, the Commissioner of Essequebo and Pomeroon Rivers District has done a great deal to direct attention to the vast resources of the interior, and to stir up interest in the vast uncultivated and, for a great part, unexplored *Hinterland* which, according to him, is a veritable land of Ophir, if it do not actually contain that El Dorado for which so many have searched in vain. . . . . Mr. McTurk does not speak rashly when he thus dilates on the riches of the interior; and in the course of his report, he takes the opportunity of reminding Press critics and others that in the past he was the first to discover the diamond fields of the Mazaruni though his statements were not altogether accepted with credence . . . . . Regarding the gold industry, the Commissioner remarks that the Omai is the only company in his district that is developing its properties on modern lines, and they deserve every credit and encouragement as the pioneers of an expensive experiment. The report also deals with the neglect of the india-rubber industry. Although there are several varieties of trees producing india-rubber indigenous to the Colony, Mr. McTurk is not aware of a single instance in which an attempt has been made to collect it in quantities . . . . . Letterwood, one of the most valuable of varieties known, which is sold by weight instead of by measure is to be found in large quantities. It is gathered, not by people of this Colony be it noted, but in considerable quantities by the Brazilians from the Canaku mountains, within the colonial limits, and taken down the Takuta and Rio Branco for exportation. . . . . Mr. McTurk makes some pungent remarks on the neglect of the timber trade. "I do not think," he says, "that in any part of the world there is a greater variety of timber than in this colony. When properly selected, and free of sap, its durability is unimpeachable, and its beauty for cabinet work is recognized. Still, this only applies to such kinds as are in general use. Many of those that are both handsome and durable await recognition. Some feeble attempts have been made, I know, to introduce other than the general used woods, but unsuccessfully. . . . A tree is cut down and squared and is often on the sawpit a week or a month after it has been cut down; no time is allowed for seasoning in its log form, and this equally applies after it has been sawn into boards. If this wood (as it usually is) is taken and used in this state, I think there is little cause for wonder that it proves unsatisfactory". . . . . There are many other valuable hints and suggestions in the report—a report of a different type from the dry-as-dust ones, the productions of some other departments – and business men will do well to peruse it.'

PRODUCTION OF BEES-WAX.

Mr. George S. Hudson, the Agricultural Instructor of St. Lucia writes:—Muscovado Sugar can now be purchased throughout the West Indies in wholesale quantities at from 3*s.* to 4*s.* per cwt. Bees-wax is worth about £8. 0. 0. per cwt. I suppose the honey flow in the West Indies does not exceeed four months a year in the most favoured localities, and in most places much less. How would it pay to work for wax production by keeping a 'feeder' in each hive with either dry sugar or syrup or molasses nearly all the year round, making the honey produced (which would naturally be execrable) a by-product, and wax the main product? This is a matter in which I doubt whether American experience can help much, but I think some Jamaican bee-keepers could tell us something about this. It should not be very difficult to ascertain precisely the feeding value of 1 cwt. sugar to bees in wax and honey production, in the same way that the feeding value of fodder to cattle is found.

[Mr. Hudson's suggestion seems a good one, but there is a slight doubt whether feeding the bees to such an extent would not incite 'swarming.' He would, of course, have to use the extractor and feed back the 'honey-syrup.' It is said that it takes about 10lb. of sugar to make 1 lb. of bees-wax. It would be a great boon to West Indian bee-keepers if the method should prove successful, as they could import the Indian bees, spoken of in the Department pamphlet *Bee-keeping in the West Indies*, p. 13, for the purpose.—[Ed. *A.N.*]

The Lime Industry of Antigua.

Efforts are being made to encourage the lime industry in Antigua. Last season 36 barrels of limes, 98 casks of lime juice and 4 casks of concentrated juice were shipped. The Botanic Station has received orders for 10,000 plants for next season's planting.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the **Commissioner, Imperial Department of Agriculture, Barbados.**

It is particularly requested that no letters be addressed to any member of the staff by name. Such a course may entail delay.

Communications should always be written on one side of the paper only. It should be understood that no contributions or specimens will, in any case, be returned.

All application for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on the last page of this number.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News

Vol. I. SATURDAY, SEPTEMBER 13, 1902. No. 11.

NOTES AND COMMENTS.

Popularity of Bananas in England.

At a recent lecture at Liverpool Mr. J. Scouler pointed out that whereas eleven years ago only about 30,000 bunches of bananas were imported into England, last year 3,000,000 bunches came from the Canary Islands in addition to 450,000 from Jamaica.

Gunga in the West Indies.

With reference to the article on this subject (p. 136) the *Jamaica Daily Telegraph* writes: 'We agree perfectly with what the *Agricultural News* says of the article in *Chambers's Journal* on "the gunga curse in the West Indies." The statements made by the writer of the article (as we stated at the time we reproduced extracts from it) are highly sensational and almost altogether erroneous.'

Toronto Exhibition.

According to a notification in the Dominica *Official Gazette* (August 23): 'three packages containing eighty-eight samples of the island's produce in glass bottles, and ten crates of various kinds of fresh fruits were despatched to the Toronto Exhibition per S.S. *Ocamo* on the 31st. ultimo. It is satisfactory to find that this collection of samples was larger and better in every way than the one sent last year, to the Halifax Exhibition, and it is hoped that it may be the means of drawing public attention in Canada, to the capabilities and resources of this island. Messrs. Pickford and Black have kindly consented to arrange the Dominica samples in an attractive manner. Cordial thanks are due to those who have contributed exhibits and especially to Mr. J. Jones for his careful efforts in collecting, packing and organizing the despatch of the Dominica exhibits.'

Praedial Larceny.

A Committee has been appointed at Dominica to inquire into the prevalence of praedial larceny in the island. His Honour S. R. Pemberton is Chairman.

Dominica Pine-apples.

In a letter to the *Dominica Guardian*, the Administrator, Mr. H. Hesketh Bell gives an interesting account of the result of trial shipments of pine-apples made to the London market. Several crates of large 'Maipuri' pines (originally obtained from British Guiana) shipped in April realized only 9*d*. each. On the other hand, ten crates of 'Bull-head' (Jamaica) and 'La Brea' (Trinidad) pines, shipped in May sold, twenty-nine at 2*s*. each and eighteen at 2*s*. 3*d*. each. The Maipuri pines again sold badly only fetching 1*s*. apiece. The whole consignment after all expenses had been paid averaged 11*d*. apiece. Mr. Bell concludes: 'the results of the several trial shipments that I have made from Dominica during the past two years conclusively prove, I think, that very large profits may reasonably be expected from the cultivation of pine-apples in Dominica, and it is hoped that land owners here will turn their attention seriously to this minor product.'

Sugar-cane Experiments in Barbados.

A special Planters' meeting was held on Friday the 12th. inst., under the auspices of the Barbados Agricultural Society to hear the summary of the results obtained from the experiments with seedling and other canes during the past season by the Imperial Department of Agriculture. Mr. J. R. Bovell, F.L.S., F.C.S., the Agricultural Superintendent of Sugar-cane Experiments stated that Barbados Seedling B. 208 was the best all-round cane on the result of this year's experiments. White Transparent maintained its reputation as a good all-round cane, but B. 147 was less satisfactory in the average quality of its juice, although its actual yield of sugar was very high.

Mr. Bovell announced that next year it is proposed to extend the cultivation of one or two of the best seedlings, together with White Transparent as a standard, to duplicate plots of one acre each in extent. By this means it is hoped to obtain results, under estate conditions, which should form a valuable complement to those obtained from the small area plots.

B. 147 in British Guiana.

According to Prof. Harrison Seedling Cane B. 147 is making itself a reputation for ratooning in British Guiana. Otherwise it is not much in favour.

The Recent Volcanic Disturbances.

The August number of the *Century* magazine is of more than usual interest to West Indies readers, containing as it does five articles on volcanic phenomena. Professor Kemp of Columbia University gives a general account of 'Earthquakes and Volcanoes.' His article is fully illustrated and contains a view of the old crater of Saba, now occupied by a town, and of the St. Vincent eruption of 1812. 'The last days of St. Pierre' contains a graphic story of the Martinique disaster, in the form of the daily journal of the Very Rev. G. Parel, Vicar-General, to the Bishop of Martinique who was in Paris. 'As a contribution to the melancholy record it has a unique and lasting interest and value.' 'Life in the Doomed City' consists of a series of abstracts from the leading paper of St. Pierre, *Les Colonies*, from May 1 to 7. These are of particular interest as almost all the copies of the paper were destroyed and a complete set for the week previous to the eruption was only obtained with great difficulty.

'The Catastrophe in St. Vincent,' contains the interesting narrative of Capt. Calder, chief of the Police, and Mr. T. McGregor McDonald, one of the leading planters in the island. The series ends with a translation of the Younger Pliny's account of the eruption of of Vesuvius, A.D. 79.

By means of two maps the relative areas of destruction at St. Vincent and Martinique are graphically shown.

The Guinea Grass Moth.

During the past months a caterpillar has been a serious pest of guinea grass and other grasses in Barbados, and is doubtless generally familiar in the island. An account of the life-history of the insect will appear in the forthcoming number of the *West Indian Bulletin*, from the pen of the Rev. N. B. Watson. The insect has been identified as *Remigia repanda* Fabr., the insect which proved destructive to grasses at San Fernando in Trinidad and Grenada during last year. It is recorded from Canada, Central Africa, Brazil, Jamaica, St. Vincent in addition to the above localities, and is evidently widespread, probably occurring in many foreign localities as well as throughout the West Indies.

Jamaica Horses.

Jamaica horses are well known throughout the West Indies for their hardiness and speed. To these good qualities must be added their comparative cheapness. It would be of great advantage to both Jamaica and the other West Indian Colonies if the trade in Jamaica horses could be increased.

The Royal Mail Company have recently shown their willingness to help in this direction, and will now carry horses from Jamaica to Barbados for the sum of £5. If the Royal Mail Company could see their way to run a cargo ship between Trinidad, Barbados and Jamaica, a good trade might also be carried on in Jamaica cattle. At present Barbados imports most of its cattle from Porto Rico, and Trinidad from Venezuela. The disturbances in Venezuela have seriously affected the exports of cattle thence, and Trinidad is looking at the present moment to the possibilities of the Tobago stock farms.

With reference to efforts being made to encourage a trade in Jamaica horses and mules, the Rev. T. P. George, Honorary Secretary of a Jamaica Horse Show which it is proposed to hold near Kingston in February next, writes:—

> I enclose two circulars as to the above, which will explain the objects of the Show as far as this island is concerned, but in addition we hope the Show will promote and increase trade in horses and mules between Jamaica and the other British West Indian Islands, especially Barbados and Trinidad. We believe that this Colony can supply all the horses and mules the other islands require and better animals than are now being imported from America, at the same price or less. The idea in Barbados at present seems to be that our best horses are those that would sell for about £16. Carriage horses of best quality, four years old, broken, and in fine condition can be got here for sums varying from £25 to £35: and they are horses that can compete with any in the world for endurance and hardiness, as you having lived here know.
>
> Our Show will bring together specimens of our best horses and mules from all parts of the Colony; and we are hoping that two or three representatives from Barbados and Trinidad will come and see what we have and tell us what they want.

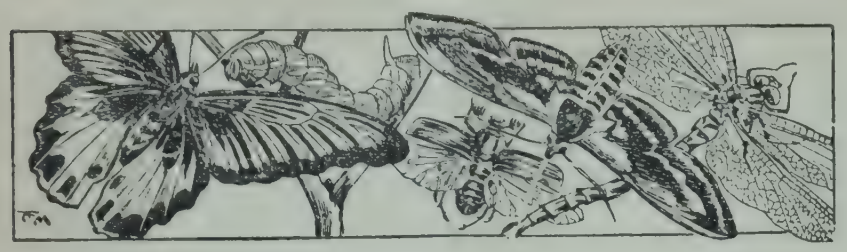
English Hares at Barbados.

It is not generally known that English hares were introduced into Barbados about sixty years ago and that they have become thoroughly established in the island.

Mr. J. P. Mason informs us that hares from England were obtained by Mr. Thomas Trotman owner of 'Bulkeley' estate, St. George, in 1840-41. These were placed in an enclosure about three acres in extent, surrounded by a wall 4 to 5 ft. in height surmounted by a railing. This enclosure is still in existence near 'Bulkeley' House. The hares increased in numbers until 1850 when, after very heavy rains, a pond situated in the neighbourhood of the enclosure overflowed and caused a portion of the wall to fall. The animals then escaped and gradually they have spread all over the island.

Dr. T. Sinclair Browne, and two of his brothers imported a pack of Beagle hounds and regularly hunted the hares in the parishes of St. Philip, St. John and St. George. There were only certain periods of the year in which they could be hunted, namely, during the latter part of the time of reaping the sugar-canes, and for a few weeks afterwards.

Since the introduction of the mungoose, about 1878, a steady decrease has been noticed in the number of hares. Many also have been shot every year by sportsmen. They sometimes weigh as much as 7 to 10 lb. and are readily bought at about 3*s*. to 5*s*. each.



INSECT NOTES.

Insects attacking Bananas.

Two reports have been received during the past months of insects injuring bananas. In the first, numbers of beetles were found burrowing in the stems of the plants at St. Lucia. The beetles also attack tannias and lead to the death of a large number of the plants, by burrowing in the stems and roots. The attack is apparently a serious matter, as the damage is rarely noticed until it is too late to take proper steps. The beetle is black, about one inch in length, with shining wing covers. It is similar in form to the common 'Hardback' beetles and appears to belong to that group. The remedial measure found useful consists in searching for the beetles on the bunches of bananas. A few are found every two days. Possibly more could be collected by setting lights with trays of molasses or water at night as the beetles appear to be readily attracted.

In the second attack, reported from Jamaica, a large beetle was found eating green bananas. The insect is one of the large horned beetles, with three prominent horns on the front of the body. It belongs to the same family as the preceding beetles, but is more closely related to the Hercules beetle of Dominica.

Planters of Dominica will recall the plantain weevil *Sphenophorus sordidus* that destroyed their plants during the year 1900. That was a more serious case as the whole life-history was passed in the banana trees.

These three beetles constitute the only insect enemies of bananas so far reported to this Department. It is hoped that further facts will be obtained as to these insects and any other enemies of bananas and tannias; and when a more complete account has been obtained, it will be published for the benefit of those interested in these crops. It is interesting to note that in the periodical *L'Agriculture pratique des pays chauds* for July 1902, there is a reprint of an article written in 1849 on a weevil *(Sphenophorus lyratus)* attacking bananas in Martinique. Mention is also made of two other species of *Sphenophorus*, with similar habits; the author was uncertain whether live banana trees were attacked and regarded the insects as possibly useful in hastening the decay of the dead trees.

The Green Page Moth.

A note entitled the 'Blue Page Moth' appeared on page 56 of the *Agricultural News*, dealing with an insect determined as *Urania sloanus*. This identification has been corrected by Sir G. F. Hampson of the British Museum (Natural History) to whom specimens were sent, and it should be known as *Urania leilus*, the 'Green Page' Moth. Mr. L. Guppy, junior, of Trinidad has recently ascertained the food-plant of the caterpillar of this moth and his account will be published in the next number of the *West Indian Bulletin*.

PINK EYE IN CATTLE.

Mr. C. W. Meaden reports the occurrence at the Tobago branch of the Government Stock Farm, Trinidad, and the surrounding neighbourhood of an infectious disease affecting the eyes of cattle. Although not of a very serious character, it is said to occasion temporary blindness in some instances. The affected cattle were successfully treated by segregation, and the application of a solution consisting of equal parts of boracic acid and sulphate of zinc, by means of a syringe. The eyes and face were also washed with a disinfectant made by dissolving 10 grains of corrosive sublimate in a bucket of water.

'In an article, reproduced by the *Farmer and Stock Breeder* from the *Montreal Witness*, this disease, popularly known in the United States and Canada as 'Pink eye' is described, and preventible measures are suggested. The disease, which is said to be contagious, seems to attack young cattle rather than old, and old cattle more severely than calves, but cattle of all ages will take it. It does not affect any animals but cattle. The first symptom usually noticed is a profuse discharge of tears from one eye, running down over the face: the disease usually begins in one eye and later attacks the other eye. In some cases both eyes may be attacked at the same time. Associated with the discharge is inflammation of the eyelids; the front part of the eye ball becomes milky-white in appearance, and one spot red or copper coloured. At this point an abcess usually forms, which subsequently discharges a small amount of pus that escapes with the tears. In some cases, this abcess weakens the front of the eye to such an extent that it bursts and allows the contents of the anterior chamber to escape. In the majority of such cases the animal is rendered permanently blind in the affected eye. Practically, however, no animals die of the disease

The disease may be prevented by keeping infected animals away from the healthy. Once introduced, it may be checked by isolating the infected animals. As a successful treatment, the following is suggested: The affected animal should be placed in a darkened stable, the eyes thoroughly washed with cold water, all secretions removed, and a solution of boric acid, 20 grains dissolved in an ounce of water, should be applied. A few drops of Harlem oil, or a little ointment made by mixing one part of finely pulverized iodoform with twelve parts of fresh lard or vaseline, can be applied directly to the eye-ball by putting it on the inside of the eyelid and gently rubbing it over the surface. Cloths wet with cold water and kept over the eyes are useful in reducing the inflammation.'

As will be seen, the treatment adopted in the United States and Canada is very similar to that used at Tobago. It will be of interest to know whether this disease has occurred at Jamaica or any other of the West Indian Islands.

COTTON GROWING IN THE LEEWARD ISLANDS.

The following is the conclusion of the interesting paper on cotton growing read by Mr. Watts, Government and Analytical Chemist, before a meeting of the Agricultural and Commercial Society of Antigua on August 1 last, and a summary of the discussion which followed:—

RECENT EXPERIMENTS ENCOURAGING.

Some experiments have already been made in Antigua, St. Kitt's and Montserrat, and so far they are encouraging, though far from conclusive. In most instances the yield of cotton (lint) per acre was small, but the cotton bushes had been planted far too wide apart. What the best distance will be, must be determined by experiment, but I would suggest that 2ft. by 3ft. will be somewhat near it.

Some samples of Leeward Islands cotton grown last season have been valued in England at 9*d.* and 10*d.* per lb: and these would have been valued at far higher prices but for the presence of broken fibre due to imperfect ginning. The values of other samples are given in the *Agricultural News*, July 9, 1902, page 103:—

Sea Island	7½*d.*	Hawkins Prolific	4⅝*d.* to 4¾*d.*
King's Improved	4¾*d.* – 5*d.*		
Upland	6*d.*	Native Montserrat	5¾*d.* – 6*d.*
Peterkin	4½*d.*		

Native Cotton (St. Lucia) 4½*d.* – 4¾*d.*

The valuers think, with regard to the sea island, that it might easily fetch more money.

By next mail I hope to be in receipt of the report on the samples grown at the Experiment Station, Scots' Hill, Antigua, and ginned in the hand power gin recently exhibited to the Agricultural Society.

Although the experimental yields of cotton were small, due largely to too wide planting, I see no reason why we may not expect to reap 300lb. of cotton (lint) to the acre, and this will pay at prices within those quoted for the samples.

It is not supposed that planters will put in large areas in cotton without making preliminary experiments to satisfy themselves that there is some chance of success. We have therefore ordered a supply of the best sea island cotton seed, which is available for distribution amongst those who are disirous of making systematic trials. I would suggest that those who are interested should make applications for this seed and establish trial plots of about one acre. The cotton grown on these plots can be cleaned in the gin belonging to the Department of Agriculture and thus the whole experiment may be made at small cost.

TIME FOR PLANTING.

It is important that we should ascertain the proper time for sowing cotton seed. It is desirable that the crop should come to maturity so that the cotton may be reaped in the dry months: these are usually January, February, March, thus the sowing should take place about August; but experience is needed to afford reliable information. Experience may point out how cotton may be grown in rotation to other crops and perhaps to sugar.

It has been asserted here that cotton is an exhausting crop. This is quite erroneous if care be taken to dispose of the seed in a proper manner: this being done, cotton ranks with sugar as one of the least exhausting crops. The seed contains comparatively large amounts of nitrogen, potash and phosphates, and if these are removed and not returned to the land there will be some exhaustion. The cotton seed is valuable for the oil it contains, and it is generally utilized in the United States for oil production, the oil being expressed and the residual cake used either for cattle food or for a manure.

Under our circumstances I think it will be better to use it as cattle food until the quantity produced becomes too great to be so employed; in this way we shall save the food value of the oil and obtain the residue in the form of manure, if we have properly constructed cattle pens and stables. Later on when the industry has grown to some magnitude we may discuss the desirability of erecting oil mills for the removal of the oil which may be exported while the cake is reserved for cattle food and for manure. In this way our lands will be enriched instead of impoverished by this crop.

CONCLUSIONS.

The points I want to urge are:

That we have climate and soil conditions thoroughly suitable for growing cotton.

That we can grow the best and most valuable kind of cotton (sea island) to advantage, this being the home of the plant.

That it is necessary to exercise great care in maintaining the quality of cotton grown by the careful selection of seed.

That in starting the industry we should decide upon the best method of packing, using a uniform system throughout the Colony. The merits of the Bessonette system should be inquired into.

That sea island cotton is now in demand in Europe and America so that the present is a favourable time for starting the cultivation.

That the Department of Agriculture is prepared to afford active assistance to any persons endeavouring to start cotton growing, or undertaking experiments in its cultivation.

The extract from *The Times* in the *Agricultural News*, July 19, page 103, is significant and important.

This affords us a very favourable opportunity for starting investigations, and I think we should use every effort to come into line with this movement in England.'

DISCUSSION.

An animated discussion followed in which Hon. C. A. Shand, Messrs. Cowley, Spooner, Harper, W. R. Abbott and others took part. In the course of the discussion frequent reference was made to the cultivation of cotton in Antigua between 1860 and 1870. From this the general impression was gathered that at that time the plants were grown much wider apart than Mr. Watts had suggested, that the cultivation was simple and inexpensive, that little or no use was made of the cotton seed, and that the industry had been abandoned partly because of the great fall in price coupled with the relatively high price of sugar. The Hon. C. A. Shand, who has had some experience in cotton sampling, spoke in high terms of the qualities of the samples of cotton exhibited, which were grown at the Experiment Station at Scots' Hill. The Hon. C. A. Shand, Messrs. Spooner, Cowley and S. Smith were nominated as a Committee to co-operate with Mr. Watts and the Officers of the Department of Agriculture in endeavouring to ascertain whether it is possible to establish a remunerative cotton industry in Antigua, and to assist in the experiments in cotton growing to be made with the seed supplied for the purpose by the Department.

POULTRY.

The following notes on Breeds of Poultry are from the pen of Mr. John Barclay, of the Agricultural Society, Jamaica, in continuation of those in previous issues :—

LEGHORNS.

The Leghorn class, of which there are white, brown, buff, black and other varieties, hold the best records for number of eggs laid of any breed? The white is the warmest favourite for usefulness, but I prefer the handsome brown Leghorn for our hot climates. The Leghorn is undoubtedly the most popular of the non-sitting varieties, if we judge by the number kept in the United States and Great Britain; no other breed is so largely kept, and it is because of its hardiness and excellent laying qualities. The Leghorns are layers; they are not of much value as table birds; they are so active that flesh is not put on readily, but this activity which prevents the accumulation of flesh, encourages the development of the egg organs. In this particular the Minorcas possess a distinct advantage over the Leghorns, as their flesh and skins are beautifully white and tender, and they will be found to get much plumper with less trouble if put up for fattening and kept from exercise. But in hardiness and activity, whether in the North or in the South, the Leghorns cannot be beaten. In all my experience the only pure-bred fowls that will stand and actually thrive in exposed and wet places in the West Indies just as well as in hot and dry districts, in confinement or at large, are the Leghorns, and as they are so poor as table fowls, the all-round fowl, a fair table fowl, and a fair layer, may be produced by the cross of the Leghorn (preferably Brown Leghorn) cock, on the Plymouth Rock, Buff Orpington or Indian Game hens. These crosses will do well under the most trying conditions of weather in hot countries better than any pure breeds, and are most handsome birds.

MINORCAS.

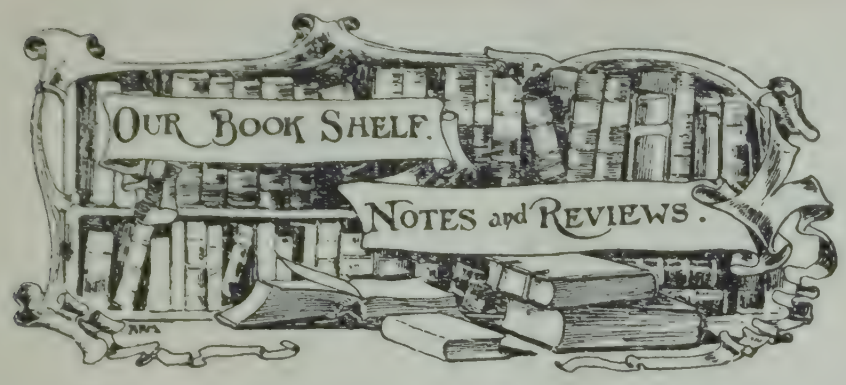
The next best layers for number of eggs and the layers of the largest eggs of all breeds as a general rule, are Black Minorcas. Indeed if eggs were sold by weight, these would be the most profitable fowls in certain localities. They are larger fowls than Leghorns, are full breasted, black-legged with white skins, very delicate flesh, and sometimes run to a very fair weight. Minorcas are of something the same type as the Leghorns, very active and not inclined to make flesh but to turn their food into eggs. They are, however, tender fowls compared with the Leghorns, and do not give the same good results in wet and cold places. Minorcas are without doubt the best breed for the hot plains and dry places, and they have ever thrived in such localities. It is my deliberate opinion that they (the Leghorns and Minorcas) are the best utility fowls of pure breeds for the West Indies and the most profitable in all directions.

Egg production here is more profitable than the production of flesh, and we are not yet such connoisseurs, have not yet such decided taste in fowls, that we will only take them for table if they are of a certain colour or size or shape, whereas northern markets have their whims and prejudices. You must suit your conditions and market. The laying breeds come to maturity and begin to lay two months before the large breeds; they eat less, they work more; and you thus outlay less to raise them and you get profit two months before your larger breeds begin to lay. Your laying breeds do not sit; they lay more eggs in a year than your sitting breeds, and as a rule, taking more exercise, are healthier and at the end of their egg days sell just as readily, though, having one or two pounds less weight, they fetch about a shilling less. But they make this twice and three times over in less cost of raising, and in the greater number of eggs laid, and I think above all in their favour is the fact that these active breeds, especially the Leghorns, do not take on fat easily and that they may therefore be fed freely on the most common foods and the handiest food produced in the West Indies, viz., corn (maize), without dying of apoplexy. Where large breeds are fed freely on corn and cocoa-nut, as is done in Jamaica, the number of fine fat fowls that are found dead beneath their roosts in hot weather, is sometimes most disheartening. They have been over fat and died suddenly of apoplexy. Of course this can be avoided by not feeding corn, cocoa-nut, or very starchy foods much, and using imported foods like wheat, and oats. But I speak of the conditions as I find them, and people will feed corn as the food they find the readiest and cheapest to hand, and to make fowls profitable, you have to study your natural conditions and adapt your methods to local circumstances as far as possible. In families where good table birds are as important as eggs and both flesh and eggs are wanted, I would recommend, especially for wet localities, the Leghorn-Plymouth Rock, Leghorn or Old English Game-Orpington cross; and for hot or dry places or cool upland places, not too wet, the Minorca-Indian Game, Minorca-Black Orpington, or Langshan-Minorca cross in order named. All these crosses would also do very well anywhere.

(To be continued.)

REPTILES OF BARBADOS.

We have already referred to the two harmless snakes that at one time were fairly abundant at Barbados. The other reptiles met with in the island are four species of lizards. The more common of these is the pretty green lizard *(Anolis alligator)* which occurs generally in the Lesser Antilles and probably was introduced thence to Barbados. The Gecko or 'Wood Slave' *(Hemidactylus mabuia)* found in shady, moist localities has almost world-wide distribution in the tropics. Another lizard locally called 'Scorpion' *(Mabuia agilis)* is said to be rare in Barbados. Colonel Feilden obtained specimens of it from Graeme Hall Swamp and Chancery Lane in 1888. It occurs over the greater part of tropical America. The largest and handsomest lizard in Barbados is what is known locally as 'Guana', probably a corruption of Iguana. This is found generally in the West Indies and South America. Colonel Feilden in 1889 mentioned the curious fact that all the specimens of this lizard in the British Museum were females and that probably the male was undescribed. The mongoose has greatly reduced the numbers of this lizard and probably, before long, it will entirely disappear.



THE BERMUDA LILY DISEASE. By Albert F. Woods. *Bulletin No. 14, Division of Vegetable Physiology and Pathology, U. S. Department of Agriculture.*

Every summer large numbers of bulbs of the Bermuda or Easter lily are raised in Bermuda and shipped to the United States where they are forced during the following autumn and winter. For some years a disease of continually increasing destructiveness has seriously interfered with the forcing process.

The disease is characterised by the spotting and distortion of the leaves and flowers and the stunting of the plant. It is said to destroy from 20 to 60 per cent. of the crop in the United States where the bulbs are forced for early flowering. It is also prevalent in Bermuda. The disease is due to a combination of causes. In the first place the bulbs have become weakened by improper selection and propagation when they are attacked by mites, fungi and bacteria. Some damage may also be caused by overwatering and consequent asphyxiation of the roots.

The spotting and distortion of the foliage is due to the attacks of aphides and the young of the bulb mite, to the injection of water into the young leaves in watering or syringing, and to the presence of water between the young leaves of plants having soft foliage.

The disease cannot be cured or even prevented by adopting any single course of treatment. It is suggested that great care should be taken to improve the stock and only strong and vigorous plants should be used for propagation. Crop rotation might be practised in order to prevent the increase of mites and injurious fungi. The bulb should not be raised till quite ripe and care exercised during forcing in planting, watering and fertilizing.

THE QUEENSLAND AGRICULTURAL JOURNAL Vol. X, Part 6, June 1902.

Situated partly in the tropics and possessing a soil and climate suitable for products such as sugar, coffee, bananas etc., and possessing a market in the Commonwealth of Australia for any tropical produce that may be raised, the agricultural development of Queensland is naturally of interest to all connected with agriculture in the West Indies.

In the present number of the *Queensland Agricultural Journal* is to be found an interesting account of some irrigation experiments with sugar-cane carried out at Bundaberg under the direction of Dr. Maxwell, the well-known scientific adviser of the sugar planters of the Colony. The effect of the water applied to the land under canes is very evident and large crops are anticipated. So far, however, the crop has not been reaped so that the yield of sugar per acre is not known. The results, when published, cannot fail to be interesting.

A second interesting article is that on the agriculture of the northern or tropical part of the Colony by the editor. It would appear that the coffee industry is likely to succeed and that rice growing pays.

DEPARTMENT NEWS.

Mr. Harold Maxwell-Lefroy, M.A., F.E.S., F.Z.S., Entomologist on the staff of the Imperial Department of Agriculture in the West Indies has returned from leave and resumed the duties of his appointment from the thirtieth of August, last.

A pamphlet (No. 17 of the Department series) is in hand giving simple and practical hints as to the Treatment of Fungoid pests on cultivated plants in the West Indies.

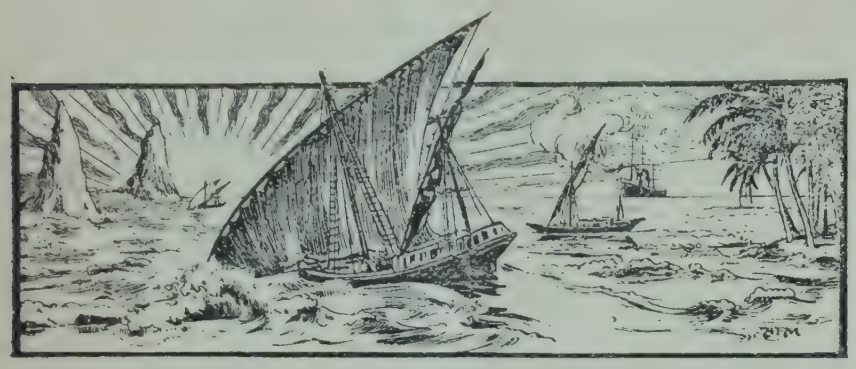
The Report on the Economic Experiments carried out in connexion with the Botanic Station, Antigua, has just been issued. These experiments are directed mainly towards the improvement of existing local food stuffs and the introduction of new crops, and should have an important influence on the future welfare of the island.

THE LANGUAGE OF BIRDS.

Mr. E. Kay Robinson in the course of a pleasant article on this subject in *The Country* for March says:—

Anyone who is familiar with poultry unconsciously learns to distinguish and understand their language. First there is the 'cheep' of the chicken. Ordinarily this is pitched in a comfortable conversational key, and so long as you hear it at intervals you know that everything is going on all right with the brood; but when it is loudly and rapidly repeated you go out to see what is frightening the chickens, and a very loud and insistently prolonged cheeping tells you that one or more of the chickens has 'got lost.'

But the cheeping of the chicks is not the only sound which comes from the fowl-run. From the clucking of the old hen you can tell when she is merely keeping her family round her while she looks for food, when she has found something good, when she espies danger, when she summons her chicks to shelter, when she misses them, and when she is attempting to terrify an enemy in their behalf. Then there is the hen with no family as yet; you can hear her communicative 'cluck' on discovering an unexplored yard, by which she invites the company generally to come and give her their opinions, the reassuring cluck with which she leads them past the gate, the warning note she utters when something moves in the straw, and the squawk of terror with which she rushes from the place on discovering that it is a boy. If it is some lesser evil, she will stand aloof uttering raucous cries from her stretched neck, and all the poultry-yard will join in the chorus. At such times, you are liable to be deceived into thinking that she has laid an egg, for it is one of the peculiarities of fowl language that the same phrases seem to be employed to announce a new laid egg in the nest-box and a cat in the straw-yard. But I think that the clamour of a hen who has laid an egg is really a device to distract attention from it. To the cat in the straw-yard she shouts 'I see you'! like a woman who, from the doorway, suspects a burglar's boots under her bed; and so, after leaving her egg in the nest, she comes out and shouts 'I see you'! because the race has found by experience that this is a good way of distracting the attention of lurking enemies, from the egg which cannot fly to the hen which can.



NEWS FROM THE ISLANDS.

The Hon'ble William Fawcett, B.Sc., F.L.S., has been appointed representative for Jamaica at the International Plant Breeding Convention to be held in New York on September 30 and October 1 and 2 next.

Umbrella ants are reported to be troublesome to cultivated plants at British Guiana, Trinidad, Tobago and Carriacou. The most effective remedy is carbon bisulphide soaked in cotton wool and placed in the nests (See *Agricultural News*, p. 140.

The third series of lectures to teachers of the Elementary Schools at Montserrat and the Virgin Islands is proposed to be delivered by Mr. George Whitfield Smith in November next.

Onion-growing from sets is often a surer method than from seed. A small proprietor at Montserrat has successfully raised his own sets this year. The right method for growing onion sets is described in the *Agricultural News*, page 150.

In order to assist in improving the breed of beef and milch cattle at St. Vincent, the Imperial Department of Agriculture has allotted a special grant to that island for the purchase of a thorough-bred Hereford bull.

The Barbados Legislature has recently voted £100 'to be placed at the disposal of the Imperial Department of Agriculture for the West Indies to meet expenses in connexion with the attempts which are being carried out by the Department to establish the sale of local produce in English and other markets.'

At Montserrat the Papaw is grown in nearly every yard and small garden, and the milk obtained from the fresh fruit is sold for making into papain. (See *Agricultural News*, pp. 4-5.) According to the local instructor, this plant, which is almost neglected elsewhere, 'affords a means of livelihood to many of the peasantry.'

An interesting plot to be called 'Coronation Plot,' laid out with ornamental plants and in garden beds for the use of the children attending the Anglican, Wesleyan and Roman Catholic schools at Plymouth, Montserrat, was recently opened by his Honour the Commissioner (Mr. F. H. Watkins.)

Mr. George S. Hudson, the Agricultural Instructor at St. Lucia, during the last fortnight has visited almost every locality in that island and his report indicates that his services are becoming increasingly useful to the planting community.

Mr. Hart has kindly contributed seeds of a fine large guava known in Trinidad as the Red or Cayenne Guava. It has fewer seeds than the ordinary kind and is filled with a sweet reddish pulp. (See *Trinidad Bulletin*, October 1900).

The Date Palm trees, including the celebrated Tafilat variety obtained from Algeria in 1891 and planted at Copse Cross, Antigua, fruited for the first time in 1895. We regret to learn that the trees are now badly attacked by a fungus disease. This is a common disease on half-wild date palms in the West Indies and requires careful attention.

About 15 acres of Government land adjoining Morne Bruce, suitable for the cultivation of lime, cacao and food crops are about to be added for the use of the Agricultural school at Dominica.

Mr. Jones the Curator reports that a Garden Pavilion, a cloak room and other buildings have recently been added to the Botanic Station at Dominica.

Several plots of Choiseul, Piura and Kidney cotton have recently been planted at the Rivière Dorée station at St. Lucia. Sea Island cotton will be planted as soon as seed is obtainable.

A special effort is being made by the Antigua Agricultural Society to enlist the interest of all classes of the community in the Agricultural Show proposed to be held in December next. Mr. Sands is giving lectures and addresses in the country districts and numerous hand bills have been distributed giving due notice of the Show.

The war in Venezuela has stopped the export of cattle thence to Trinidad. Tobago offers good opportunities for raising cattle, guinea grass being wild throughout the island and the island should be able to raise cattle for the Trinidad market.

The mango crop at the Botanic Station, Grenada, this year, is reported as quite a failure: even the Grenada Ceylon No. 1. which has hitherto fruited freely and regularly failed to produce a single panicle of flowers.

The Cotton Gin, obtained some months ago by the Imperial Department for use in the Leeward Islands, has recently been at work at St. Kitt's, cleaning some 8,000 lb. of seed cotton. It is hoped that next year, if circumstances permit, there will be a steam gin at St. Kitt's.

Amongst the wild animals of Tobago is the Manacou or Opossum. It is very common and destructive to poultry, frequently raiding the yards and killing and carrying off fowls. The young are carried by their mothers in a pouch, like the Kangaroo.

The uselessness of shipping undersized pines of poor quality to the London Market may be judged from the fact that of a recent shipment of two barrels from one of these islands, 40 sold at 2*d.* a piece, 23 at 1*d.*, while the remainder were reported as 'worthless.' An average lot of pines from two other West Indian Islands fetched 3*d.* to 9*d.* each whilst some special Dominica pines have realized 2*s.* 3*d.* each.

An exceptionally heavy fall of rain was experienced at the Botanic Station, Tobago, on August 21, 1·89 inches of rain falling in forty-five minutes. Considerable damage was done to seed beds and roads at the Station and several landslips occurred throughout the island.

JAMAICA: REPORT ON THE GOVERNMENT LABORATORY, 1901-2. By Mr. H. H. Cousins, M.A., F.C.S., Government Analyst and Agricultural Chemist.

The following extract is taken from Mr. Cousins' report, for the year ending March 31, 1902:—

'The Laboratory has been considerately treated by the various public Departments, and unnecessary appeals to the Chemist have been avoided, thus enabling a larger proportion of agricultural work to be carried out. The work on soils has been the chief item in the work of the Laboratory during the last year. It is hoped that analyses of the soils of all the chief crop-producing areas will soon have been completed and a preliminary account of the agricultural state of Jamaica soils be made available to the public. So far, the soils exhibit a high standard of fertility: phosphoric acid is peculiarly rich in most cases. On the whole, the reserves of fertility in Jamaica soils seem to be very great and good cultivation alone should result in maximum crops for many years in many cases.

It is to be regretted that the Sugar Industry does not make more use of the Government Laboratory. Analyses of juice would have shown many estates during the first month of the crop season that the canes were still unripe and the season at least a month later than usual. It should also be of value to an estate to know what its sugars polarize before shipping to the States or United Kingdom.

Owing to the applications for assistance from planters in respect to injurious insects and fungoid diseases, the Imperial Commissioner at Barbados was requested to furnish a list of books of service in this direction. He gave much valuable advice and his officers have afforded us material assistance.

Owing to the operation of his Excellency's Proclamation on October 1, the Laboratory staff have been responsible for the practical execution of the fumigation of imported plants. Small consignments are treated at the Laboratory, while accommodation for large importations has been provided at the wharf in East Street. A consignment from South Africa badly infested with a scale new to Jamaica was among the first fruits of the Proclamation.

Owing to the serious consequences that frequently arise from the planting of infested citrus trees and pine suckers, growers throughout the island should fumigate such stock before selling or planting it. The cost is insignificant.

Local Agricultural Experiments.—A grant of £140 having been made for fertilizers, experiments (at 30 different centres throughout the island, involving 220 manurial plots) on the chief crops of Jamaica, viz: bananas, canes, pines, coffee and tobacco have been started. The manures were weighed and mixed, and bagged at the Laboratory. In many cases the application was personally supervised by the Laboratory staff. Painted posts to mark the plots were also provided. Samples of soil and subsoil from all experiment plots, as well as many representing agricultural areas of interest have been taken for analysis. Detailed reports will be made to the Board of Agriculture and be available to the public in due course.

AGRICULTURAL INSTITUTIONS IN THE WEST INDIES.

Jamaica Board of Agriculture: *Chairman*: The Hon'ble Sydney Olivier, C.M.G.; *Secretary*: W. R. Buttenshaw, M. A., B.Sc.; *Publication*—Occasional Bulletin.

Jamaica Agricultural Society (with thirty two affiliated Branches). Kingston, Jamaica. *President*: Sir Augustus W.L. Hemming, G.C.M.G. *Deputy Chairman*: Hon'ble Wm. Fawcett, B.Sc., F.L.S. *Secretary*: John Barclay. *Publication*: "Journal of the Jamaica Agricultural Society."

Royal Jamaica Society of Agriculture & Commerce & Merchants' Exchange, Kingston, Jamaica. *President*: Hon'ble Lieut-Colonel Ward, C.M.G. *Secretary*: J. L. Ashenheim. *Publication*: Annual Report.

The Institute of Jamaica: Kingston, Jamaica. *Chairman*: Sir Fielding Clarke. *Secretary*: Frank Cundall, F.S.A., *Curator of Museum*: E.S. Panton *Publications* "Journal of the Institute of Jamaica." "Jamaica in 1901."

Kingston & St. Andrew Horticultural Society. Kingston, Jamaica. *President*: Hon'ble Wm. Fawcett, B.Sc. *Secretary*: William Harris, F.L.S.

British Guiana Board of Agriculture, Georgetown, Demerara. *Chairman*: Hon'ble A.M. Ashmore, C.M.G. *Deputy Chairman*: J. B. Harrison, M.A., C.M.G., ; *Secretary:* Oscar Weber: *Agricultural Instructor:* R. Ward: *Assistant Instructor in Agriculture:* J. E. Beckett (on probation); *Veterinary Surgeon*: J. A. Raleigh.

British Guiana Royal Agricultural & Commercial Society Georgetown, Demerara. *President:* Luke M. Hill, B.A., M.I.C.E. *Secretary*: Thomas Daley. *Local Secretary*: (Berbice,) Dr. C. F. Castor. *Assistant Secretary and Librarian*: J. Rodway, F.L.S.. *Curator of Museum*: Richard Evans, M.A., D.Sc., *Publication*: "Journal of the Royal Agriculture and Commercial Society of British Guiana."

Trinidad Agricultural Society, Port-of-Spain, Trinidad. *President*: Sir Alfred Moloney, K.C.M.G. *Secretary*: Edgar Tripp. *Publication*: "Proceedings of the Agricultural Society of Trinidad."

Grenada Agricultural Society, St George's, Grenada. *President*: Sir Robert B. Llewelyn, K.C.M.G. *Secretary:* W. E. Broadway. *Publication*: Minutes of Meetings.

Barbados General Agricultural Society & Reid School of Practical Chemistry, Bridgetown, Barbados. *President*: Sir. George C. Pile, Kt. *Secretary*: J. H. Poyer. *Publication*: "Barbados Agricultural Gazette and Planters' Journal."

St. Lucia Agricultural Society, Castries, St. Lucia: *President*:——— *Secretary*: R. G. McHugh.

Dominica Agricultural Society, Roseau, Dominica. *President*: The Hon'ble H. Hesketh Bell. *Secretary*: A. K. Agar.

Antigua Agricultural Society. *President:* His Excellency the Governor; *Chairman:* Hon'ble T. D. Foote; *Vice-Chairman* Hon'ble J. F. Foote; *Secretary*: W. N. Sands.

St. Kitts-Nevis Agricultural Society. *President:* Honourable E. G. Todd. *Secretary:* C. A Smith.

[Further particulars of Agricultural and Horticultural Institutions in the West Indies would be gladly received for this list. Also fixtures for Agricultural Shows for 1902.]

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—August 19, 1902.—Messrs. J. Hales Caird & Co., Messrs. Gillespie Bros. & Co. and 'The Public Ledger,' August 16, 1902.

Aloes—Curaçoa 16/- to 40/-; Barbados 13/- to 35/- per cwt.
Arrowroot—St. Vincent, $2\frac{3}{4}d$ to $3d$ per lb.
Balata—Venezuelan, 2/1 to 2/4 per lb.
Bees-wax—Jamaica, fair reddish and pale £7 17*s* 6*d* to £8. per cwt.
Cacao—T'dad, 62/- to 70/6 ℙ cwt.
Dominica 57/6 per cwt.
Grenada, good 55/6 to 60/-; choice 63/- per cwt.
Jamaica, 56/- per cwt.
Cardamoms—Mysore, 1/- to 3/- per lb.
Cassia Fistula—5/6 to 35/- per cwt.
Castor Oil—$4\frac{1}{2}d$ to $4\frac{3}{4}d$ per lb.
Coffee—Jamaica, none offered.
Costa Rica, 44/- to 74/- per cwt.
Peaberry, 45/- to 57/6 per cwt.
Cotton—West Indian, $4\frac{1}{2}$ to $5d$. per lb.
Cowage—$1d$ to $2d$ per lb.
Fustic—little offering.
Ginger—Jamaica, good bold 52/-; ordinary to good ordinary 38/- to 40/- per cwt.
Honey—fair amber 16/- to 17/- per cwt.
Jalap—$4d$ to $6d$ per lb.
Khus-Khus Root—12/- per cwt.
Kola Nuts—$1d$ to $4d$ per lb.
Lime Juice—Raw, 1/3 per gallon; concentrated, £12 10*s*. to £12 12*s*. 6*d* per pipe.
Logwood—No quotations.
Mace—1/2 to 1/7 per lb.
Nitrate of Soda—Agricultural £8 17*s*. 6*d*. per ton.
Nutmegs—103*s* @ 9*d*, 74*s* @ 1/6, 68*s* 1/11*d* per lb.; in shell $4d$ to $5d$ per lb.
Oil of Limes—Distilled 1/9; Hand pressed 4/- per lb.
Pimento—$2\frac{7}{8}d$. per lb.
Sarsaparilla—Jamaica fair 1/3 per lb.
Sugar—Muscovado 13/- to 14/- duty paid; crystallized 12/3 to 15/- per cwt.
Sulphate of Ammonia—Grey, 24 per cent., London £12 2*s* 6*d* per ton.
Tamarinds—11/6 to 14/- per cwt.
Tonquin Beans—$9d$ to $2/6d$ per lb.
Fruit—Covent Garden Market ('Gardeners' Chronicle,' August 16, 1902.)
Bananas—7/- to 12/- per bunch.
Lemons—15/- to 25/- per case.
Oranges—10/- to 12/- per case.
Pines—3/- to 6/- each.

Halifax N. S.—'The Maritime Merchant', July 31, 1902.

Lemons—$4.00 per case
Molasses—Porto Rico 30c. to 31c., Barbados 24c. to 25c. per gallon.
Pine-Apples—$2.00 per dozen.

New York,—Aug. 8, 1902.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaica, 9 hands $1.00 to $1.10, 8 hands 75c., 7 hands 45c. per bunch.
Cacao—African 12¾c. to 13c.; Caracas, 13¾c. to 14½c.; Jamaica, good ordinary 11c: good fermented 12c. Grenada 13c. to 13½c. Trinidad 13c. to 14c. per lb.
Cocoa-nuts; Small Trinidads $12.00 to $13.00; Jamaicas $21.00 to $23.00 per M.
Coffee—Rio, good ordinary 5¾c.; Jamaica good ordinary 6c. to 7c. per lb.; Manchester grades 9c. to 11c. per lb.
Ginger—8c. to 8½c per lb.
Pimento—5½c per lb.
Rubber—Nicaragua Scrap 49½c. per lb; sheet 43c. to 45c. per lb.; Guayaquil Strip 47½c. per lb.
Sugar—Muscovado, 89°, 2⅝c. to 2⅞c.; Centrifugals, 96°, 3⅜ per lb.

INTER-COLONIAL MARKETS.

Antigua,—August 27, 1902.—Messrs. G. W. Bennett, Bryson & Co., Ltd.

Molasses—9c. per imperial gallon, package included.
Sugar—Muscovado $1.17½ per 100lb.

Barbados,—Aug. 30, 1902.—Messrs. T. S. Garraway & Co., and Messrs. J. A. Lynch & Co.

Arrowroot—good quality, $3.50 per 100 lb.
Cacao—$13.50 per 100 lb.
Coffee—Jamaica and ordinary Rio $9.00 and $9.50, per 100 lb. respectively.
Hay—New Brunswick 90c. per 100 lb.
Manures—Nitrate of Soda $60.00 per ton; Ohlendorff's Dissolved Guano; $60.00. Sulphate of Ammonia $80.00; Sulphate of Potash $70 per ton.
Molasses—No quotations.
Onions—Madeira $2.50 to $2.75 per 100 lb.
Potatos—$3.00 per 160 lb.
Rice—Ballam $4.60 per bag; Patna $3.75 per bag; Rangoon $3.00 per bag.
Shalots—10c. per lb.
Sugar—No quotations.

British Guiana,—August 28, 1902.—Messrs. Weiting & Richter.

Arrowroot—$8.00 per barrel.
Cacao—native 11c. to 12c. nominal.
Cassava Starch—$7.00 per barrel.
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica 11c. to 12c. per lb. (retail.) Creole, 11c. to 12c. per lb.
Eddoes—$1.20 per bag.
Onions—bulk sold at 4c. per lb.
Pea Nuts—Curaçoa 3¾c.; American 5c. (retail.)
Plantains—20c. to 36c. per bunch.
Potatos English—wanted.
Rice—Ballam $4.80 to $4.90 ex store; Patna $5.90 to $6.00 per bag—Creole Rice 20c. per gallon, (retail.)
Sweet Potatos—Barbados $1.56 per barrel.
Tannias—$1.44 per bag.
Yams—$3.00 per bag.
Molasses—Vacuum Pan yellow 14½c. to 15c. per gallon, casks included.
Sugar—Dark Crystals $1.62½; yellow $2.10 per cwt.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—August 28, 1902.—Messrs. Gordon Grant & Co.

Cacao—Ordinary to good red $12.75 to $13.00; estates $13.25 to $13.75 per Fanega.
Balata—Venezuelan. 42½c per lb.
Coffee—Venezuelan. 7c to 7¼c. per lb.
Onions—$2.00 to $3.00 per 100lb.
Potatos English—$1.70 to $1.75 per 100lb.
Rice—Yellow $4.75; White Table $5.75 per bag.
Sugar—For Grocery use, $1.75 to $3.00 per 100lb.
Molasses—No quotation.

DEPARTMENT PUBLICATIONS ON SALE.

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May 22, 1902.

H. J. INNISS,
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AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. I. No. 12. BARBADOS, SEPTEMBER 27, 1902. PRICE 1*d.*

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Agricultural Education. II.

IN the *Agricultural News* for July 19, a brief statement was made as to what was really in view in the scheme of Agricultural Education in the Elementary schools. It was pointed out that this was practically identical with the proposals already in force in other countries under the name 'Nature Study,' and that whether we label our efforts 'Agricultural Education' or 'Nature Study' our object is exactly the same, namely, to draw the children 'to take a deep and abiding interest in the phenomena of air, soil and water, and in the life of plants and animals and lead them step by step to exercise their powers of observation and reason from cause to effect in watching the every-day life around them.'

We desire to state that we by no means confine our efforts to Elementary schools. The next stage in the scheme of Agricultural Education for the West Indies is the establishment of scholarships tenable at Agricultural schools for strong, healthy boys of the peasant class (from 15 or 16 years of age) irrespective of creed or colour. These boys are boarded and trained free of expense to their parents for three or more years. The object is to turn out an intelligent class of working gardeners and small farmers capable of not only skilful cultivation but accustomed to cure and pack produce for export so as to obtain the best results for their labour.

There are about seventy boys now holding scholarships at the Agricultural schools at St. Vincent, St. Lucia and Dominica. The results, so far, are distinctly encouraging.

A higher stage is the scheme of instruction in Agriculture to boys in Secondary and High schools assisted by special instructors provided by the Imperial Department of Agriculture. There are two Scientific and Agricultural masters and several scholarships tenable at the Grammar schools at St. Kitt's and Antigua.

There are five local scholarships tenable at Harrison College at Barbados with a Lecturer in Agriculture provided to take boys above the fourth form who wish to specialize in Agricultural Science. There are two scholarships of the value of £75 each, also tenable at Harrison College, offered for competition in the Windward and Leeward Islands. In addition there is a Lecturer in Agriculture provided by the Department at Jamaica. This officer is engaged in giving lectures to students at the Training Colleges and assisting in furthering Agricultural teaching generally in the island. All the scholarships at Secondary and High schools are awarded, preferably, to boys from the country districts, the sons of planters in moderate circumstances, who intend to devote themselves to agricultural pursuits. So far there has been keen competition for all the scholarships offered by the Department and the boys have acquitted themselves creditably.

SUGAR INDUSTRY.

Sugar-cane Experiments at Barbados.

A special meeting of the Barbados Agricultural Society was held on Friday the 12th. instant to hear the report presented by Mr. J. R. Bovell, F.L.S., F.C.S., and Mr. R. Radclyffe Hall, B.A., on the results of the work conducted during the past season, under the direction of the Imperial Department of Agriculture. The paper was well illustrated throughout by specially prepared diagrams and charts. In this way the more important results were brought, in a graphic and striking manner, to the attention of the planters.

MANURIAL EXPERIMENTS.

The experiments with manures were conducted on four estates in different parts of the island, the total area of the manurial plots being 17 acres.

The weather in December and January was dry, and the young plants only became established with difficulty. February to May were, as usual, dry, windy months, but from June to September the rainfall was excessive, being no less than two and a half times the average for these months, for the last fifty years. The 'wash' of the surface soil was very considerable and the good results of careful tillage were lost to a considerable extent. The rainfall from October to December varied considerably in the different districts and was not high anywhere. At the end of the year a drought set in, and persisting, hastened considerably the ripening of the canes.

Taking the manurial experiments as a whole, Mr. Bovell said the results indicated that:

(1) Nitrogen is essential for the production of maximum returns and under the conditions which obtained on the manurial plots 50 to 60 lb. per acre of nitrogen as sulphate of ammonia applied half in June and the balance in August is the most paying amount.

(2) Where the land has been liberally manured with farmyard manure, phosphates are not only unnecessary but may do harm.

(3) On the whole, even where the land has been liberally manured with farmyard manure, applications of potash are beneficial. The most satisfactory results were obtained with about 50 lb. per acre.

(4) The time has arrived when each planter should ascertain for himself what manure is best suited to his canes under the soil and climatic conditions which obtain on his own estate. These experiments if rightly carried out need not cost anything and would in all probability save the planters many pounds. Suppose, for instance, a planter wanted to ascertain whether phosphates were necessary for his cane crops. Let him choose a fairly level field of, as far as he can judge, uniform character which had received uniform treatment; let him divide it in half, to one half apply a manure consisting only of nitrogen and potash, to the other the same mixture to which phosphates had been added. When the canes arrive at maturity let each half or a portion of each half be crushed separately and the gallons of juice ascertained and the density by the ordinary Beaumé saccharometer noted. By experiments of this sort, which are easily and inexpensively carried out, planters will soon be able to decide for themselves whether it is necessary to apply phosphates to their canes. The day will, we hope, come when the planters will have a system of rotation in which the minerals will be applied to the root crops in the rotation and the canes grown with liberal applications of farmyard manure supplemented with sulphate of ammonia or nitrate of soda.

SEEDLING AND OTHER CANES.

Experiments with selected and other varieties of canes were conducted at eleven estates in typical localities of the island. The weather conditions were adverse as already noted.

The complete list of the varieties cultivated is as follows:—

Jamaica or Mont Blanc, Rock Hall, Sealy Seedling, White Transparent, B. 147, B. 156, B. 208, B. 254, B. 347, B. 376 and D. 95.

As a result of the whole series of experiments, Mr. Bovell was able to state that Barbados Seedling B. 208 was, as last year, the best all-round cane, taking into account its ready germination, the yield of sugar, the richness and purity of its juice and the satisfactory results obtained on black and red soils, plants and ratoons. The indicated yield of muscovado sugar for plant canes was 3·0 tons per acre on black soils and 2·6 tons per acre on red soils. (The 'black' and 'red' soils are characteristic of the low lands and of the hills respectively).

Mr. Bovell recommended B. 208 for an estate trial on a strictly limited scale.

The White Transparent maintained its reputation

as a good all-round cane. Its juice was rich and pure. Its indicated yield of muscovado sugar for plant canes on black soils was 2·6 tons per acre and 1·8 tons per acre on red soils.

With regard to this cane it was unfortunately necessary to give a note of warning. The number and weight of rotten canes were counted every year, from each plot, and White Transparent was this year at the bottom of the list. Last year also it had a considerable number of rotten canes. Planters should take pains to plant only from canes showing no signs of fungoid disease.

B. 147 gave unsatisfactory results as to the average quality of its juice. Its indicated yield of muscovado sugar was, however, very high on black soils, being 3·0 tons per acre; on red soils the estimated yield was only 1·4 tons per acre.

NEW SEEDLINGS.

A large number of seedling canes have been crushed and tested for the first time and thirty-one selected for more extended cultivation. The calculated saccharine yield of all of these selected seedlings was over 9,000 lb. per acre. The juice of the lowest contained 1·928 lb. of saccharose per gallon, and the highest 2·487 lb. The quotient of purity of the latter cane was 94·03 and its glucose ratio 2·21.

Space does not allow us to dwell on all the interesting points discussed by Mr. Bovell. Some of those remaining, together with the remarks of Dr. Morris, we propose to deal with in our next issue.

Sugar-cane Experiments in British Guiana.

The following extracts are taken from the Progress Report by Prof. J. B. Harrison, C.M.G., on the Sugar-cane experiments in British Guiana, for the half-year ending June 30, last. The report for the previous half-year will be found on pp. 2 and 3. :—

Early in March a commencement was made of the very necessary work of improving the drainage of the experiment fields. During the period under review this has been steadfastly followed up, and, assisted by the advice of the Honbles. B. H. Jones and R. G. Duncan, and the expert supervision of Mr. B. Gainfort, members of the Sugar-cane Experiments' Committee of the Board of Agriculture, the drainage system has been to a great extent remodelled and at present its efficiency is far beyond that hitherto attained. From the improvements contemplated to be carried out by Mr. Gainfort in the near future with regard to the main drainage of the Botanic Gardens estate, I anticipate a further marked improvement in the condition of the Board of Agriculture's experiment fields.

The experiments with selected varieties of seedling canes have been continued in the Brickdam field during the period under review and the canes have received appropriate agricultural treatment. The older varieties of seedlings there planted show promise of satisfactory returns as second ratoons: the newer varieties planted in February have not done so well, having been adversely affected by the continuous rainfall, but now show signs of promise. Similarly, 396 seedlings of 1891 from the White Transparent and Bourbon varieties, planted in this field have been retarded in growth.

The canes on the manurial experiment field were reaped, weighed and examined analytically in April, the results obtained being of some interest and importance. Samples of soil have been taken from the variously manured plots, and analytical examinations are being carried out on them with the view of ascertaining whether any, and if any, what changes capable of being detected by analytical examination have taken place in the soils of the plots during the experiments conducted continuously on them since 1891.

The southern half of the manurial experiment field has been re-arranged and planted with certain seedling varieties with the object of testing their nitrogen requirements; the course of experiments with phosphoric acid and potash started in 1901 having been carried to completion.

A very careful selection has been made from the enormous number of seedlings raised from selected parent varieties in 1901 and 4,500 have been planted out. Large numbers of the seedlings of selected parentage have been distributed to certain managers of sugar estates who have expressed their desire to assist in this portion of the work.

On the whole, I am satisfied that the sugar experiment fields are now in a far more satisfactory state of cultivation than has hitherto been possible. Very great assistance has been given to me by the technical members of the Sugar-cane Experiments' Committee of the Board of Agriculture, and I am convinced that the appointment of an advisory committee, the members of which are acknowledged authorities in practical cane cultivation, in connexion with the experiments is a step in the right direction, and one that cannot fail to be of advantage not alone to the experiments but to the sugar industry of the Colony at large. I only regret that this step was not taken at the initiation of the extension of the experiments in 1890.

In addition to the various investigations which are being carried on in the Government Laboratory, I have devoted much time to the preparation of the report dealing with the experiment agricultural work carried on during the crop years 1897-1901 inclusive.

This is now in an advanced stage of preparation and I hope to have it ready for presentation in the course of a few weeks.

The total expenditure on the experiments for the year 1901-02 has been $2,301.

In bringing this progress report to a close, I desire to acknowledge, and to direct attention to, the consistent energy, zeal and attention which Mr. R. Ward, Agricultural Assistant-in-charge of Sugar-cane Experiments has devoted to his work and which, in my opinion, cannot fail in the near future to render the experiments a credit not only to the Board of Agriculture but to the Colony at large.

WEST INDIAN FRUIT.

SPINELESS LIMES.

The cultivation of a plot of Spineless limes at the Botanic Station, Dominica, was drawn attention to on p. 38 of this Journal. We were not then in a position to say whether the juice of this variety was equal or inferior to that of the ordinary lime for estate purposes.

In the Annual Report for 1901-02 on the Dominica Botanic Station, Mr. J. Jones, the Curator, says: 'This variety differs from the ordinary lime cultivated in the island in having a more erect habit of growth, smaller fruits, with fewer seeds, superior bearing qualities, and greater acidity of juice.'

Samples of the fruit of trees of the spineless and the ordinary (spiny) varieties, grown side by side in the garden, were sent to Mr. Francis Watts, the Government and Analytical Chemist for the Leeward Islands, for analysis with the following results:—

	Juice of Spineless Lime.		Juice of Ordinary Lime.	
	Oz. per gallon.	Grains per oz.	Oz. per gallon.	Grains per oz.
Free Acid	16·88	46·15	14·10	38·55
Real Citric Acid...	16·60	45·39	14·32	39·15

Mr. Watts adds:—

'These figures indicate that the spineless variety of lime produces juice very rich in citric acid. The quality of the juice is satisfactory. It only remains to be shown that the quantity of fruit and of juice are equally satisfactory when it will be safe for planters to introduce this variety extensively into their cultivation.'

PINE-APPLES AT DOMINICA.

A collection of pine-apples has gradually been formed at the Botanic Station, Dominica, with the object of testing the suitability of various kinds to local conditions. In the Annual Report for 1901-02 on the Station, Mr. J. Jones, the Curator, records the following interesting notes:—

The collection of fourteen varieties has done very well. Eleven have fruited. Pines of several have been shipped to test their carrying qualities. It should be noted, that the plants were grown in ordinary soil, and in no case was any special or other kind of manure applied.

Black Antigua: This small, excently flavoured, well-known pine can, under good cultivation in Dominica, be increased in size until it weighs from 4 to 5 ℔. That this increase in size and juiciness has been obtained without impairing its excellent keeping qualities has been proved by shipments from this island. A consignment of 100 pines made by his Honour the Administrator to London, a large portion being supplied from the Station, arrived in good order and realized 9*d.* each, at the same time as fruits of the same variety grown and shipped from Antigua were selling in London at 2*d.* and 3*d.* each. In August a crate of fruits was sent to the Halifax Exhibition and these remained in perfect condition several weeks after their arrival in Canada. In December an experiment shipment was made, by direction of his Honour, to Liverpool, via Canada. Owing to a breakdown of the steamer the pines reached Liverpool after being six weeks on the journey, yet the fruits were in good order. The Black Antigua is probably the best of all the pines, and the one thing to aim at is to increase its size and make it one of the 'fancy' pines.

Maipuri: This variety came from Demerara. It is a fine, bold-looking fruit of good flavour, very juicy, averaging 6 to 7 ℔. Specimens have been grown 10 ℔. in weight. Its chief drawback is the ridiculously small top for so large a fruit. A shipment of one crate containing eight fruits, made in December last per Royal Mail Steamer, reached Liverpool, via Southampton, in perfect order. The fruits were much admired and appreciated. Its merits as a shipping pine cannot be known until further consignments have been made during the hot months.

The Brazilian Pine, obtained through the Commissioner of Agriculture, has fruited. It is unsuited for export on account of its small size. Its habit of growth, too, is bad, the fruit being borne on a very long stalk. Its flavour is delicious and it is well worth growing for local markets.

La Brea: Perfect fruits of this are most handsome, but we find that a very large percentage of the pines are spoiled by the formation of grotesque tops. A sufficient number of good-shaped fruits could not be got together to make a trial shipment. The pines are of a good size averaging 6 to 7 ℔. in weight.

Queen or *Golden Queen:* The suckers of the Golden Queen obtained from Jamaica proved to be the same as the variety 'Queen' already grown here, and which originally came from Kew Gardens. This variety is largely grown in hot-houses in England. It is a fine pine, producing good fruits weighing from 5 to 6 lb., but in Dominica it is affected

with 'black heart' disease to such an extent that it is worthless for shipping.

Charlotte Rothschild: The fruits of this variety are large and perfect in shape. If pines with a good appearance are required in the markets, this variety would stand first. Compared with other kinds its flavour is poor.

Slips of all the varieties are being grown in nursery beds, and should a demand arise for plants the Garden will be in a position to supply a quantity.

At one of the meetings of the local Agricultural Society a collection of seven varieties of pine-apples was shown. The weight of the collective exhibit was 35 lb. or an average of 5 lb. per fruit.

SHIPPING SWEET POTATOS.

A well attended meeting of planters and others was held at the Planters' Hall, Barbados, on September 6, his Excellency Sir Frederic M. Hodgson, K.C.M.G., in the Chair. The object of the meeting was to place before the public the actual results of the experiments in shipping sweet potatos to England which have been conducted during the past year.

Sir Frederic Hodgson, in the course of his introductory remarks suggested that the name 'Barbados potato' be adopted for export purposes, adding 'we have the Jamaica banana, the Liberian coffee, and we ought to have the 'Barbados potato.'

Dr. D. Morris, C.M.G., reviewed the efforts already made. He pointed out that when the matter was started last year an appeal was made to a few planters only to join in the experiment. The most cordial co-operation was at once received and during the whole of the period, from December to May, a certain number of barrels of potatos was shipped by each mail to appointed agents in England. The potatos were put on the market and sold for whatever they would fetch. The matter having passed successfully through this preliminary stage, it was now intended to throw it open to the whole island. Any planter wishing to take part in the experiment should send in his name to Mr. J. R. Bovell, the Superintendent of the Botanic Station, who would arrange for the shipment of the potatos to appointed agents. An account of the profits arising from the trial shipments has already been given (see p. 99). To this Dr. Morris was enabled to add that, allowing £3 per acre as the cost of cultivation, the net amount the planter should receive, according to the available data, appeared to be about £9 to £10 per acre. Planters must, however, carefully bear in mind that the exportation of sweet potatos still demands careful organization. There is as yet only a limited demand and any large and unexpected shipment may easily swamp the market. It is essential to have definitely appointed agents ready to receive an arranged number of barrels of potatos, just as many in fact as can be disposed of immediately they arrive. What is wanted is a regular supply of produce of good quality, and suitable size, delivered in Bridgetown a day before the mail leaves.

An interesting discussion followed and finally the following resolution was proposed and carried unanimously:—

That it is advisable that Planters who are desirous of assisting this movement should send in their names at an early date to the Superintendent of the Botanic Station stating the quantities they are prepared to ship, and the special dates on which they are prepared to ship them. That all arrangements should be left in the hands of the Superintendent of the Botanic Station, and we pledge ourselves to use our influence that no shipments be made except through him.

DIRECTIONS FOR PACKING.

For the guidance of intending shippers of the 'Barbados Potato' the following regulations have been issued by the Superintendent of the Botanic Station, through whom for the time being all shipments are to be made:—

Potatos intended for shipment to the English market should be dug on the Monday preceeding the Saturday on which the Royal Mail Steam Packet Company's steamers leave Barbados. They should be then spread on the floor of a dry, well-ventilated room, until the following Friday, when they are to be packed in barrels and sent to Messrs. Gardiner Austin & Co.'s store, Pier Head, Bridgetown. The barrels should have about one dozen equi-distant, clean-cut holes of $1\frac{1}{4}$ inch diameter bored in the sides for ventilation. The object of drying the potatos for a few days before they are packed is to harden the skin and so prevent its being easily bruised.

Red potatos will be taken in preference to white ones.

The potatos should not be less than twelve nor more than twenty ounces in weight.

Bruised, over large, or improperly packed potatos will be rejected.

A deduction of 5 per cent. on the selling price will be charged for receiving the potatos, shipping them, receiving and distributing the money, etc.

TORONTO EXHIBITION.

The *Toronto Daily Star* for September 5, contains the following appreciatory comments on the West India Exhibit. Great credit appears to be due to Messrs. Pickford and Black for their care in displaying the produce of these Colonies:—

The display of British West Indies' products by Pickford and Black of Halifax is one of the most neatly arranged in the entire grounds, and to those who have never visited these islands of pleasant breezes an inspection of the Pickford and Black exhibit is a revelation.

The West Indies hold as native a tree called the greenheart, and a sample of this wood is on exhibition. It is almost as hard as ironwood, and yet its interior is composed of pith, which is of considerable value commercially.

The deftness of native fingers is shown in really marvellous fancy work, made both from the bark of trees and native grass. Jippi-Jappa hats are also tributes to deft hands, and a close second to Panamas in looks and lightness.

Gold-bearing minerals and diamonds add mute tribute to the resourcefulness of the region.

Then there are also seen cocoa-nuts bunched, and ripening upon a branch; citrons, limes, lemons, oranges, calabashes aloes, bitter aloes, and raw cotton.

The display is new, and is one of the most artistically arranged on the grounds.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the **Commissioner, Imperial Department of Agriculture, Barbados.**

It is particularly requested that no letters be addressed to any member of the staff by name. Such a course may entail delay.

Communications should always be written on one side of the paper only. It should be understood that no contributions or specimens will, in any case, be returned.

All application for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 191 of this number.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News

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NOTES AND COMMENTS.

Surra Disease in Horses.

A summary of the character of this disease and its accompanying symptoms has already appeared on p. 147 of this Journal. The attention of the West Indian Governments and stock owners is directed to the following extract quoted by *Nature*, the leading English scientific weekly Journal:—

Surra, a disease affecting horses and other animals, and due to a protozoan parasite, the *Trypanosoma Evansi*, has been found to be very prevalent in the Philippines, causing the death of no less than 2,000 of the army transport and cavalry horses in a period of six months. This disease, met with also in India and Burma, *is now regarded as identical with nagana or the tsetse-fly disease of Africa.* In India, the exact mode of transference of the disease from one animal to another has not been discovered, though certain 'horse flies' have been surmised to be the intermediaries. In the Philippines, Curry states that the intermediary is a fly, *Stomoxys calcitrans.* The fly lays its eggs in the excrement of horses and cattle, in which its larvae and pupae thrive, and as the disease is almost always fatal, prophylactic measures must be employed, especially the destruction of the larvae and pupae in the excrements by treatment with lime or petroleum *(Amer. Med.* July 19).

The ravages of the tsetse-fly disease in Africa are unfortunately only too well known. The importance of this note to the West Indies will be apparent when we state that the fly *(Stomoxys calcitrans)* which is stated to be the intermediary in the Philippines, is known to occur in St. Vincent, and in all probability is found elsewhere in the West Indies. It appears to be known popularly as the 'Biting Stable fly.' The introduction of one diseased horse or mule into any of these islands would therefore be sufficient to serve as a centre for the spread of this fatal disease.

The Selection of Canes for Replanting.

The attention of sugar planters is directed to the note of warning given in connexion with White Transparent cane on p. 179 of this number. Mr. J. R. Bovell there points out that in the past season's experiments at Barbados, White Transparent contained more rotten canes than any of the other varieties alongside which it was grown. The amount of disease may not be serious at present, but planters should be extremely careful to replant only from healthy, vigorous canes, which show no signs of fungoid disease.

Sugar-cane experiments in Barbados.

In the course of a review of the sugar-cane experiments at Barbados, the *Louisiana Planter* of August 23, says:—

While the work thus so effectively carried out in Barbados does not exactly comply with our climatic and other Louisiana conditions, the whole subject is one of great interest to us, as we have many points in cane culture in common, and the careful study of scientific investigation of the cane plant and of sugar manufacture in the English West Indies will always be a matter of great moment to us, and we sincerely wish the gentlemen promoting it the highest degree of success.

Packing Sweet Potatos.

A *Farmer's Bulletin* of the U.S. Dept. of Agriculture issued last year gives a good illustration of the necessity of carefully packing produce which has to be sent any considerable distance.

'Some enterprising growers of sweet potatos in New Jersey took the lead in adopting standards of appearance and quality, in grading uniformly, and packing carefully, in giving their produce a distinctive name and putting it on the market in the best possible condition with the grower's name or initials on each package. . . Buyers understood that "Jersey Sweets", on which the grower has put his name are uniform throughout the barrel with the single exception that a layer of selected tubers is placed on the bottom of the barrel in packing, which appears on the top when the barrel is opened.'

The care and extra labour entailed has proved to be well re-paid financially, and shippers of 'Barbados potatos' would be well advised in endeavouring to attain a similar standard, so that their produce may secure the confidence of the market. Directions for packing sweet potatos for export will be found on p. 181 of this number.

The Usefulness of Botanic Stations.

The list of plants distributed by the Botanic Station, Dominica, during the year ending March 31, 1902, affords an excellent example of the useful work being done by these institutions in promoting the agricultural welfare of the West Indies. This branch of the work of a Botanic Station is apt to be overlooked by the casual visitor. It makes very little show and yet demands an enormous expenditure of time on the part of the most skilled members of the Station staff.

The nurseries, so laboriously filled during the months of preparation, with plants raised from seeds and cuttings, are rapidly emptied at the planting season and all the work has to be commenced afresh.

The Dominica Station during last season distributed 60,500 economic plants in addition to large quantities of seeds, pine suckers, onion sets, etc. Amongst the more important items were 37,000 limes and 725 of the new spineless variety; 12,000 cacao plants; over 1,000 nutmeg plants; 3,000 sour orange plants for stock, and some 600 budded oranges. Of special importance were 450 rubber plants, for the cultivation of which Dominica seems well adapted.

Report of the Scientific Commissioners.

The Preliminary Report of Drs. Tempest Anderson and J. S. Flett, who were appointed by the Royal Society to investigate the recent volcanic disturbances, has been issued in the *Proceedings of the Royal Society*, Vol. 70, pp. 423-45. The sequence of events in St. Vincent and Martinique is concisely given, and the general similarity of the volcanic phenomena in the two islands indicated. The violent eruption of Mont Pelée on July 9, which they were so fortunate as to view at close quarters and yet escape unharmed is graphically described :—'The sailors cried "The mountain bursts"! In an incredibly short space of time a red hot avalanche swept down to the sea. . . Undoubtedly the velocity was terrific. Had any buildings stood in its path they would have been utterly wiped out and no living creature could have survived the blast. . . There can be no doubt that the eruption we witnessed was a counterpart of that which destroyed St. Pierre.'

The three fine plates with which the report is illustrated bear testimony to Dr. Anderson's skill as a photographer. The Commissioners express their thanks to the various officers and others who mitigated their labours and to the members of the Imperial Department of Agriculture in the various islands who 'received us with the greatest kindness, and gave us invaluable help throughout.' A full account of the volcanic phenomena will appear in the forthcoming number of the *West Indian Bulletin*, which it is hoped will be published next month.

Budded Citrus Stock.

The superiority of budded citrus plants seems to be well appreciated in many parts of the West Indies. The large number distributed during the past year from the Dominica Station, where great attention is given to this work, has been noted above. Mr. J. H. Hart, Superintendent of the Royal Botanic Gardens, Trinidad, writes: 'The fact of the demand being beyond the supply proves to the hilt that the value of budded stock is a well-recognized fact.' He adds that young budded plants can also be obtained from Messrs. Reasoner Brothers, Florida, at 25 to 30 cents per post. 'They come fairly well, but are not so strong as our own buds.'

West India Isinglass.

In reply to the inquiry on p. 154 as to the source of West India Isinglass, Mr. J. H. Hart writes:—

'This is brought from the mainland rivers and bartered here for goods. It is the "sound" of a species of sturgeon found there in considerable quantity. It is shipped from Trinidad to Europe by several of our merchants.'

Mr. Hart was good enough to accompany his remarks with a small 'sound' about seven inches in length, and five ounces in weight.

Destruction of Fish at Barbados.

A correspondent, who is deeply interested in the fishery prospects at Barbados writes in reference to the illegal destruction of fish going on in this island:—

Has your attention been called to the systematic destruction of the fish of the best descriptions which visit our coast in vast shoals in this and the preceeding months, by poachers using dynamite to kill them? A visit to the fish market any day will satisfy you that the legitimate capture wants regulating, to prevent immature fish being captured and sold. The subject of the fish-food of this community seriously wants looking after to secure the abundance from wanton waste. The capture of bait is also another source of wanton waste of young fish and fish-food. It could all be controlled for the benefit of the food supply of the community.

Rubber from Young Trees.

In the *Annual Report*, 1901, on the Royal Botanic Gardens, Trinidad, Mr J. H. Hart writes:—

'Some few years ago I published an informal account of an analysis of a year-old tree, made by a gentleman who had undertaken the study of the latex of *Castilloa*, and he reported finding 8 per cent. of rubber; but it is now evident that although rubber material may have been found, it was of inferior quality, and only the larger trees, eight or ten years old, can be depended upon to furnish rubber of good quality. It was anticipated that rubber material could have been extracted from one-year-old-trees, but this has proved illusory, for although, chemically, the rubber is there, yet it is not in such a condition as to make it of market value, and up to the present no chemical process has been devised which will change the soft and sticky material obtained from young trees into the hard and elastic produce afforded by mature trees.'

This point was also dealt with by Mr. Hart at the Agricultural Conference of 1900. (See *West Indian Bulletin*, Vol. II, p. 102.)

INSECT NOTES.

The Woolly Pyrol Moth.

A large area of green dressings is grown annually in Barbados and has this year, as in some previous years, suffered heavily from the attacks of insects. Whole fields have been destroyed by the caterpillars of the Woolly Pyrol Moth and apparently little or no effort has been made to check this destruction. There is a current belief that the eating up of these green dressings is of no importance as the vegetable matter reaches the soil after passing through the bodies of the caterpillars, and thus is not really lost to the soil. This would be true if the whole of the material of the plant reached the soil through the caterpillar, and if as much vegetable matter were produced by the plant whether or no the caterpillars ate its foliage. Unfortunately neither of these suppositions is correct.

This moth lives all the year round on a variety of plants and does not increase to any great extent until its food-plants (woolly pyrol and other green dressings) are planted over large areas. The abundance of its food supply then leads to rapid increase and the green dressings are gradually destroyed. As was pointed out in the 6th. Lecture to Planters in Barbados, in October 1901, this state of things need never occur. If *at the commencement of the attack*, the plants were sprayed with Paris green or other arsenical poison, or if they were dusted with a mixture of lime and Paris green, the first batch of caterpillars would be destroyed and the attack checked *at its outset*. The matter is in the hands of the planter, and if he followed this course it is probable that his crop would attain its full growth and he would not grow a stunted crop to be chiefly consumed in feeding hordes of caterpillars, which later become moths and fly away.

Insects Attacking Indian Corn.

Where ever Indian corn has been observed in the Lesser Antilles, insect attack has been a prominent feature. The principal pests noted are the following:—

(1) The *Moth-borer* of sugar-cane, which tunnels in the stems and ears of the corn.

(2) The *Corn Ear Worm*, a caterpillar which destroys the leaves, and especially the cobs, eating into the latter chiefly at the upper end.

(3) The *Corn Aphis*, a somewhat serious form of plant louse found in great numbers on the leaves and leaf-sheaths.

(4) The *Corn Fly*, constantly present in great numbers on the leaves and leaf-sheaths. This is a small grey-brown insect, very active, similar to the cane fly *(Delphax)*.

In addition to these four there are others of less importance. The question of insect attacks on growing corn appears to be neglected by planters. No reports have been received of these attacks and no inquiries have been made as to the remedies. It is proposed to study these pests in detail and planters and others who may observe any insect attacking growing corn are requested to assist the Department by forwarding information and specimens.

This problem is quite distinct from that of the insects attacking stored corn; this question is also receiving attention and any information or specimens concerning insects in stored corn will be of value. There is no doubt that these pests can be combated and there need not be so large a loss in the Indian corn crop as there is at present. But until those who actually grow and reap the corn are aware of the fact that these pests are at work and will supply information and specimens, it will not be possible to assist them to the full extent possible in the fight against their insect enemies.

Insects Attacking Sweet Potatos.

The insect pests of the sweet potato have been under observation during the past two years and some information concerning them has been already published. At the present time, a large amount of the crop is lost from insect attacks. It is believed that this loss is preventable, if planters and others will only take the necessary precautions to secure the full yield from their crops.

There are recorded five serious pests of sweet potato including 'Scarabee' or 'Jacobs,' the Potato Moth, and the Red Spider. These were dealt with fully in the 6th Lecture to Planters in Barbados in October 1901. In addition there are two serious pests, as well as eight of minor importance. The sweet potato crop is of such importance in Barbados and the West Indies generally that it is desirable to obtain as full facts as possible concerning its pests. Any information respecting attacks of insects on sweet potato will be of value, and all specimens forwarded to this Department will be carefully studied and will materially aid in the investigation of these pests. So far as can be seen, a small sum of money spent per acre will be sufficient so thoroughly to check most of these pests that the outlay will be far more than repaid in the increased yield. It is bad policy to grow a crop and obtain only a portion of the possible yield when a small outlay would secure a far larger yield, and it is solely on this basis that any recommendations are made with regard to the treatment of insect pests. It is hoped that more attention will be paid to this point. A field of young potatos should be most carefully watched for signs of disease, as the remedies can only be successful *if applied early*. In addition every planter should, and could, be familiar with these pests so that he may recognize the onset of the attack of any of them.

LAGOS SILK RUBBER.

Lagos silk rubber has been repeatedly mentioned in these pages as one of the rubber plants which is at present giving the best promise under cultivation in the West Indies. In Trinidad, Tobago, Dominica, it is thriving, and so far as can be said now presents every appearance of becoming of economic importance. The following early account of the species is taken from the Cantor Lectures on '*Plants yielding Commercial India rubber*,' given by Dr. Morris before the Society of Arts in 1898:—

A new rubber-yielding plant suddenly came into notice in the colony of Lagos in 1894. This proved to be a handsome tree, locally known as Ire, Ireh, or Ereh. It belongs to the same natural order as the Landolphias. The particulars respecting it were gradually accumulated at Kew until at last it was determined to be *Kickxia africana*, Benth., [now known as *Funtumia elastica*, Stapf.], a tree widely distributed in West Africa from Sierra Leone to the delta of the Niger, the island of Fernando Po, and the Gaboon.

Fig. 14. Lagos Silk Rubber.
[*Funtumia elastica* (Kickxia africana.]

(1.) Flowering branch (two-thirds natural size). (2.) Bud. (3.) Segment of calyx, with glands at the base. (4.) Corolla, cut open, with style and stigma removed. (5.) Anther, front view. (6.) Pistil with disk (*d*). (7.) A pair of follicles (fruit)—two-thirds natural size. (8.) Seed. (9.) Transverse section of seed (*t*. testa, *a*. albumen, *c*. cavity). Nos. 2 to 6, and 8 and 9, all enlarged.—[From the *Kew Bulletin*.]

The previous information was very scanty. It is believed that rubber was first obtained from it on the Gold Coast in 1883. In 1888 seeds of it were introduced to Europe as a substitute for *Strophanthus* seed, and stated to be worth 72*s*. per lb. They were called "India-rubber" seeds, but nothing further could be obtained respecting them. The following extracts are taken from the *Kew Bulletin*, 1890 (pp. 242-247):—

'In September, 1894, Kew received from Captain (now Sir George) Denton, C.M.G., two pieces of the trunk of the Lagos rubber-tree, each about 10 inches to a foot in diameter scored with the marks of the rubber gatherers. They were sent as the "female" rubber-tree, a name we learn that is locally applied to the *Kickxia africana*, Benth. It is thus distinguished from *Holarrhena africana*, quite a different plant, which is fancifully called the "male" rubber-tree. The latter is also an Apocynaceous plant, but not known to yield any rubber.

In tapping the trees the bark is first cut in a vertical direction from the bottom to the top. This single line is about $\frac{1}{2}$ to $\frac{5}{8}$ of an inch broad, and deep enough to reach the inner bark. This forms the main groove, on each side of this two series of oblique grooves about 2 feet apart are cut, each running into the main groove. The side grooves are made, beginning at the top, and gradually reaching the base of the tree. All the milk exuding from the lateral grooves will find its way into the main groove and so ultimately reach the bottom, where a vessel is placed to receive it. When sufficient milk has accumulated it is then collected and made into rubber.

The methods adopted for coagulating the milk are then described. These are at present of two kinds, viz.: "the cold process" and the "heat process." The cold process is chiefly practised by the Fanti men introduced from the Gold Coast. A cavity is excavated in the trunk of a fallen tree so as to form a cistern of the capacity necessary for holding the milk collected during several days. Into this the rubber gatherers pour the milk, after straining it, from day to day until it is quite full. It is then covered with palm leaves and left for twelve to fourteen days and sometimes much longer, depending on the

season, until most of the watery portions have either evaporated or sunk into the wood. After being kneaded and pressed together the rubber thus obtained has a dark brownish colour, with the inner portions of a slightly lighter colour. Such rubber is known locally as "silk rubber." The local price is from 10*d.* to 1*s.* 2*d.* per pound. The heat process is the one generally adopted by the natives of Lagos. This is much simpler in working, as it disposes of all the milk collected at the close of each day. After being strained the milk is placed in a vessel and boiled. The rubber begins to coagulate almost directly the heat is applied, and after the boiling is over is removed in a somewhat sticky condition, owing to being burnt, and of a blackish colour. The local price of this rubber is from 9*d.* to 1*s.* per pound. It is pointed out that the heat process, though simpler, impairs the quality of the rubber and is calculated to injure the industry. It is probable that if the heat process were somewhat modified the results would not be so injurious. An experiment was tried at the Botanic Station to coagulate the milk by heat, but not applied directly to it. The result was much more satisfactory. The rubber came off a milky-white colour, and after being pressed it was clean and firm without being sticky.

The history of this new rubber industry in Lagos is full of interest, and illustrates the wonderfully rich resources of the vast forests of West Africa. It shows also very clearly how largely these resources can be developed by judicious and intelligent action on the part of the Government.

Should the new rubber Kickxia continue of commercial value, there is no doubt that it will eventually be possible to establish regular plantations, and thus make the industry a permanent one. It has always been seen that owing to the climbing habit of the species of the Landolphia, which have hitherto yielded African rubber, it was not practicable to cultivate them in regular plantations as they required the support of other plants, and when once tapped many years would have to elapse before they would be fit to yield another crop. With the Kickxia these practical difficulties disappear.

According to M. Chalot *Kickxia africana* has been found lately in Gaboon. Specimens have been measured 1 metre in circumference and 12 to 15 metres high. Each tree is estimated to yield annually, without any injury, at least 1½ lb. of rubber.'

It is hoped to supplement the information here given by a summary of the results of the cultivation of the Lagos rubber tree in various parts of the West Indies.

The God-Ochro *(Cereus triangularis).*

The scaly flowering buds of this epiphytal cactus are known among the peasantry of Jamaica as God-ochro and used as an ingredient in soups, as formerly they were in the celebrated 'pepper pots' of the West Indies.

As a culinary vegetable this God-ochro is equal if not superior to the Ochro *(Hibiscus esculentus)*, and it is a matter of surprise it is not more generally met with in the markets.

The flower of the God-ochro is one of those known as the Night-flowering Cereus, remarkable for their large white and partially straw-coloured flowers, about 8 inches in diameter. The fruit, known as 'strawberry pear,' contains a pleasant sweet pulp enclosing numerous black seeds. The plant itself, which is a long triangular creeper is often used for withes (lianes) or tying material for fences.

POULTRY.

The following is the fifth in Mr. John Barclay's series of articles written especially for the *Agricultural News*. The importance of the subject has rendered it necessary to occupy two numbers in the discussion of 'Feeding':—

FEEDING.

The best single food-stuff for fowls would be oats or wheat, with the products of wheat called variously, middlings, shirds and sharps. These are almost typically complete foods for Jamaica, but they have to be imported and my determination has been to find food produced in the West Indies for our hens, foods that people may be able to grow themselves, or be able to buy from small settlers. Besides, the imported foods are only to be purchased in the large cities like Kingston, Jamaica; Bridgetown, Barbados; Port-of-Spain, Trinidad; or Georgetown, British Guiana, and near these cities there is no particular difficulty in fanciers keeping any breeds they please and making them successful: but at very considerable outlay for foodstuffs. It never pays to run poultry so far as strict £ *s. d.* is concerned, when all the food used has to be purchased, but people often like to keep their own fowls, even if they have to buy food for them, so that they may be assured the eggs they use are fresh, and that they may have nice, clean-fed fowls for table, always at hand. I am here dealing with the question strictly from a utility point of view, for country parts where planters and settlers keep fowls and wish to make them pay in every direction. To feed cheaply, combining sufficient nutrition and a well balanced diet, is what puzzles most people. The commonest foods and the handiest and cheapest, are nearly all very starchy foods which alone do not give best results as foods for poultry.

LOCAL FOODS.

We grow and use in the West Indies, rice and its by-product rice-bran, corn (maize), guinea corn, peas of various kinds, roots like tannias (called Cocos in Jamaica), sweet potatos, yams, cocoa-nuts and bananas. All, except the cocoa-nut are starchy foods, only the peas and cocoa-nut being rich in flesh-formers, while oil or fat is largely present in corn and cocoa-nuts. We also find the flesh-formers in animal food and thus meat scraps from the table are very good food for fowls. However, as most people have dogs to feed, there is little meat stuff available for fowls, and as our aim is to make the fowls as easily fed and as profitable as possible, there is no use in buying even the cheapest forms of meat scraps for them except they are closely confined, when animal food must be given in some form. Fowls in nature pick up at least half their food in the form of insects, grubs and worms; thus a purely grain diet would not give best results.

CORN.

The most common food used in the West Indies is of course corn (maize), because it is perhaps the easiest available, the fowls being exceedingly fond of it and taking it before any other form of vegetable food. As a single

ration or used as a large part of the food of fowls, whole corn is responsible for much of the mortality in our poultry. Plainly I say, that, a great many of the diseases and troubles that effect fowls, are directly due to feeding them on whole corn, and little or nothing else but corn.

CONTENTS OF A MODEL FOOD.

A model pound of food for a fowl as calculated for northern climates, should contain $2\frac{3}{16}$ ounces of protein (albumen, or flesh-formers); $1\frac{1}{16}$ ounce of fat and $12\frac{2}{16}$ ounces of starch. For the West Indies, less fat and less food altogether (their being less animal heat to be sustained) will make a more suitable ration, so we may knock off $\frac{1}{16}$ in the fat altogether.

ILL EFFECTS OF FEEDING CORN ONLY.

Every pound of corn is deficient in flesh-formers, to the extent of 1 ounce 1 drachm, and in starch 1 ounce 11 drachms, while there is an excess of fat, the very thing that should be avoided in our always warm climate, of 4 drachms, or of one fourth of an ounce. If fowls fed on corn alone were to eat enough to get sufficient flesh-formers, they would have to eat an excess of starch, which is fattening, to the extent of 3 ounces 9 drachms, almost a quarter of a pound, and of fat an excess of 1 ounce. As an egg consists on an average of a little over a quarter of an ounce of albumen (flesh-formers) which is the white, and a little less than a quarter of an ounce of fat, which is the yolk, the remainder being chiefly water, it will be seen that there must be this flesh-forming element called albumen to a sufficient extent in the food of the hens, and if to get this there is a large surplus of the starch and fat elements, the hen cannot use these up in energy or in making eggs, but lay up the surplus in fat. When a hen becomes very fat, the egg-making organs are clogged and she lays first, irregularly, stopping for several days, then laying a double yolk egg or some monstrosity; then she stops laying altogether; then not having any outlet for the fat-making food she is still eating, and as a fat hen is disinclined for exercise and does not go scratching after food, she lays up fat more rapidly, until, if not killed for table, one day she staggers, turns round as if giddy and falls dead, or in the morning is found dead beneath the roost. The immediate cause of death is apoplexy, the attributing cause fat, and the primary cause too much corn. If dissected the liver will be found enlarged, flabby, and diseased all through.

(To be continued.)

DEPARTMENT NEWS.

Dr. D. Morris, C.M.G., the Commissioner of Agriculture for the West Indies, left Barbados in the S.S. *Tennyson* on Tuesday September 16, for New York. The principal object of his visit to the States is to attend the International Conference on Plant-Breeding and Hybridization to be held at New York on September 30 and October 1 to 2. Dr. Morris will also visit some of the leading agricultural institutions of the United States, and interview important merchants and others with reference to a possible market for West Indian produce in that country.

Pamphlet No. 17 of the Department Series, entitled: *The General treatment of Fungoid Pests* has been issued and may be obtained from any of the local agents of the Department, price 4*d*., post free, 5*d*. The pamphlet contains a simply written account of the life-history of a typical fungus, and deals in succession with the more important root, stem, leaf, fruit and seed diseases of the West Indies. Practical remedies are given for each. Chapters are added on the preparation, application and cost of fungicides; the introduction of new pests, and directions for collecting and forwarding specimens. Five illustrations accompany the text.

During the past fortnight Pamphlet No. 18, *Recipes for cooking West Indian Yams* has also been published. (Price two-pence). It contains a brief, popular account of the yam written, not for dwellers in the tropics, but for those to whom the yam plant is not familiar. This introductory portion is followed by recipes for cooking yams and presenting them at table in an attractive manner. The pamphlet will be widely distributed in the United Kingdom and America and other countries with which it is proposed to endeavour to foster a trade in West Indian yams.

EDUCATIONAL.

Agricultural Scholarships at Antigua.

As announced on p. 107 of the *Agricultural News* the Department has been enabled to offer assistance in the teaching of elementary science and agriculture at the Antigua Grammar School. One practical step has been the founding of scholarships to be awarded to boys of Antigua and Montserrat, preferably the sons of planters.

An examination has recently been held by Mr. Francis Watts the Government Chemist, and the Rev. S. E. Branch, Headmaster of the School. As the result Henry Howes of Montserrat has been recommended for a 'Boarding scholarship', of the value of £20 per annum, and Victor Brookes, Donald Christian, Sydney Christian, Randolph Buckley, Stewart MacSevney, and Oscar Kelstick, all of Antigua, for 'Day scholarships' of the annual value of £10 each.

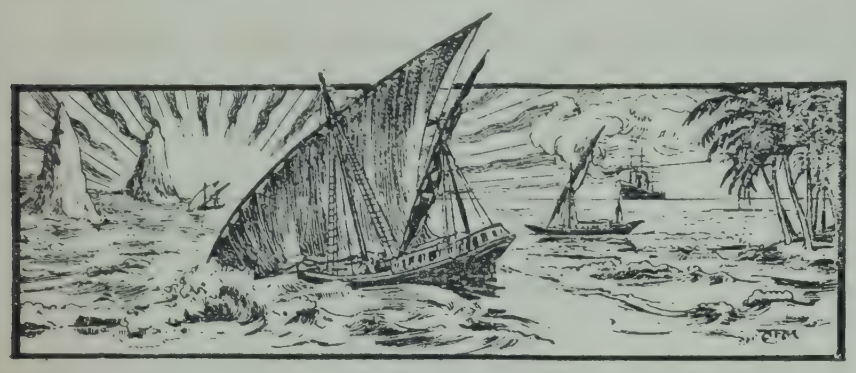
The day scholarships cover practically the whole of the recipient's school expenses, whilst the boarding scholarship meets about half the total charges. Thirteen boys competed for the seven scholarships awarded.

Cambridge Local Examinations.

When drawing attention on p. 27 of this journal, to the syllabus of the new section of Agricultural Science of the Cambridge Local Examinations, we appended some suggestions, made by the Department, to render the syllabus more suited to West Indian conditions. Concerning these suggestions the Secretary of the Examination Board in England writes:

The modifications in our schedule for Agricultural Science (Seniors) suggested for centres in the West Indies, have now been adopted by the Syndicate; and I have to thank the Imperial Department of Agriculture for the assistance which they have given us in the matter.

In the papers for December next, alternative questions will be set in accordance with the modified schedule.



NEWS FROM THE ISLANDS.

The Hon'ble Francis Watts, B.Sc., has been appointed a member of the recently constituted Board of Health for the Country districts of Antigua.

There are some vacancies for pupils at the Agricultural School, St. Lucia. Applications should be made to the Curator, Botanic Station, St. Lucia, from whom full particulars can be obtained, on or before the 30th. instant.

The Highbury rest-house has been opened for the use of visitors and travellers in Dominica, 7½ miles from Roseau, at 1,800 feet elevation and near the Imperial road. It is specially intended for persons who wish to prospect Crown lands. Application for permission to use it should be made at the Colonial Engineer's Office.

The S. S. *Trent* carried a large consignment of fruit from Jamaica to London. 1,000 packages of oranges alone, the *Jamaica Daily Telegraph* reports to have been put on board.

Mr. John R. Bovell, F.L.S., has been appointed a member of the Central Poor Law Board of Barbados.

Vanilla cultivation is becoming well established in various parts of Dominica. Large quantities of plants are now available, and the climate appears well adapted to the cultivation.

The recent volcanic disturbances appear to have caused considerable changes in the sea bed, and extraordinary difficulties have been encountered in attempting to repair the interrupted telegraphic cables.

The Hon'ble Wm. Fawcett, B.Sc., has been invited to deliver a lecture at the New York Botanic Gardens during his visit to the Plant-Breeding and Hybridization Conference. He purposes to take as his subject 'Jamaica, a Paradise for the Botanist.'

The weather in Barbados is extremely dry for the season of the year, and the crops are suffering for lack of water. The condition of the canes on the higher lands threatens soon to become serious if the drought continues.

A Planters' Guild has been formed in Barbados to initiate and promote 'measures calculated to advance the interests of the sugar industry and improve the condition of the island in general.'

Fresh Teneriffe onion seed (both red and white varieties) can now be purchased at the Dominica Botanic Station at 2*d.* per packet.

An effort is being made to promote a 'Jamaica Preserves and Honey Company Limited.' The capital is to be raised by 10,000 shares of £1 each. Mr. A.E. Wigan is to be the managing Director in Jamaica.

The weather in St. Lucia during July and August has been favourable to the crops. The rainfall has averaged about 10 inches per month.

The cacao crop of St. Lucia is stated to be much improved in prospects, although the May flowers held very poorly. With suitable weather the crop will probably be in excess of that of last year.

Mr. W. N. Sands, Curator of the Botanic Station, Antigua, read an interesting paper before the local Agricultural Society on the 'Improvement of local varieties of Indian corn'. We hope to give a full summary in a later issue.

Seeds of the 'Barbados Squash', an excellent vegetable which appears to be little used elsewhere in the West Indies, have recently been distributed by the Department to all the Botanic Stations. The plant will be carefully cultivated to test its suitability to local conditions.

The Dominica Botanic Garden contains an excellent collection of the best kinds of East Indian bananas, obtained originally through the Royal Gardens, Kew. Twenty-three varieties were sent last month to the Royal Botanic Gardens, Trinidad.

The rotting of pine-apples which unfortunately occurs sometimes during transit is apparently due to two fungi, one of which enters by bruises and the other by the cut ends of the stalks. To prevent their ravages, it is necessary to take great care in packing the fruit, and to guard against bruising and crushing during transit.

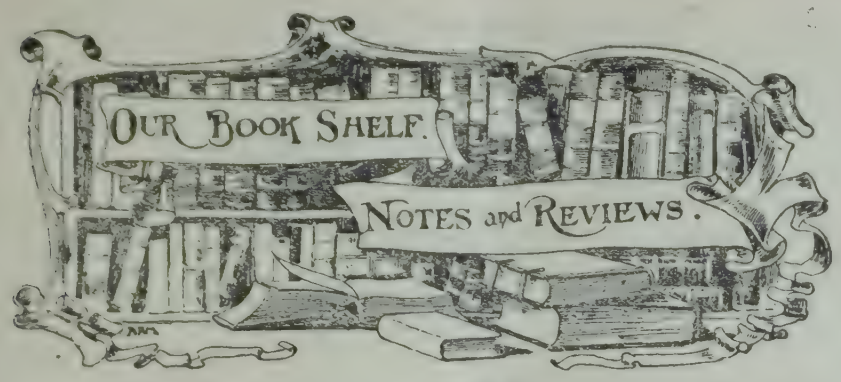
Chives are reported to do well on the highlands of Grenada and are said to yield a good profit with careful cultivation.

Of nine varieties of beans and peas tried as green dressings in Antigua this year, the Louisiana cow pea (or white bonavist) and the Montpellier bean gave the most satisfactory results. They were both fairly resistant to insect attacks.

Antigua exported during last season 27,300lb of onions to the intercolonial and New York markets. In addition large quantities were consumed locally. The crop was less than the previous year owing to the abnormally wet season.

Trinidad has received a supply of the Spineless Lime from the Botanic Station at Dominica.

Owing to the success of Smooth Cayenne pine at Antigua the Imperial Department of Agriculture is endeavouring to encourage its cultivation by importing suckers for distribution to planters, at less than cost price. 500 suckers have already been introduced from Jamaica, and 1,500 more are expected shortly.



FOREST INFLUENCES. By B. E. Fernow and others. *Bulletin No. 7, Forestry Division, U.S. Department of Agriculture.*

The question of the preservation of existing forests in the West Indian Islands and of replanting portions of some of these Colonies with trees has often been raised. The islands have been visited by forest experts and, in the case of Trinidad, a new forestry department has been instituted. The general idea has been that the removal of forest affects climate and rainfall unfavourably. Whether the many writers on this question could furnish reliable and accurate scientific data for their opinions is open to question. Climatic conditions arise from so many complex causes that extreme caution is called for in drawing general conclusions that changes in climate which may have taken place at the same time as deforestation have actually been caused by forest removal.

The necessity of studying the question on the basis of accurate measurements and observations before arriving at premature conclusions is admirably laid down in the bulletin before us, as well as the real questions to which answers should be sought as a result of such investigations. It is not so much the effects of forests on the general climate which are important as the local modifications in climatic conditions which a forest area may produce. Agricultural production depends not so much on the amount of rainfall as on its distribution throughout the year.

The main portion of the bulletin is taken up with a systematic consideration of the meteorological observations accumulated in Germany and elsewhere at forest stations, and of the relation of forests to water supplies. The author sums up the inquiry as follows:—

'We may summarise that the position of the forest as a climatic factor is still uncertain, at least as to its practical and quantitative importance, but that its relation to water and soil conditions is well established. As a climatic factor it would appear that the forest of the plain is of more importance than that of the mountains, where the more potent influence of elevation obscures and reduces in significance the influence of their cover; as a regulator of water conditions the forest of the mountain is the important factor; and since this influence makes itself felt far distant from the location of the forest, the claim for attention of Government activity and for statesmanlike policy with reference to this factor of national welfare may be considered as well founded. *Every civilized government must in time own or control the forest cover of the mountains in order to secure desirable water conditions.*'

To all in the West Indies who take an interest in the subject of forest influences we recommend this pamphlet as a guide to the kind of data which are required, locally, for the ultimate solution of the forest question.

CARRAPICHO, OR ARAMINA FIBRE.

Inquiry was recently made of the Department as to the source of a fibre which passed in Brazil under the name of Carrapicho or Aramina fibre. As no specimens of the plant were forwarded, and no reference was found in the literature available to these names, inquiry was made at the Royal Gardens, Kew, whence we were informed that the fibre was yielded by *Urena lobata*, a plant of the Hibiscus order *(Malvaceae)*, and a common weed throughout the tropics.

Description of the Plant. *Urena lobata* is an erect, much branched shrub, 2ft. to 4ft. high. The stems and leaves have a white, thick, somewhat rough, hairy covering. The flowers are pink. The plant is extremely variable in size and shape of its leaves.

Distribution. The plant is commonly found in waste ground, often near the sea, and in dry hill pastures. As already stated, it has a very wide geograhical distribution being found throughout tropical America, Africa, Asia and Australia. In the West Indies it is recorded from St. Kitt's, Antigua, Dominica, St. Vincent, Grenada, Trinidad and also Guiana.

Local Names. As might be expected from its extremely wide distribution, the plant has a large number of local names. Some of the more important of these are as follows: 'Carrapicho', 'Aramina', 'Guaxima' (Brazil), 'Ban Ochra', or 'Bun Ochro' (India), 'Ake-ire' (Yoruba land, West Africa), 'Toja' (West Africa), 'Otóto grande' (St. Thomé, West Africa), 'Cousine Mahoe' (Trinidad, Grenada), 'Grand-cousin' and 'Cousin-rouge' (Guadeloupe), 'Grand-mahot-cousin' (Martinique).

Uses of the Fibre. The fibre yielded by *Urena lobata* belongs to the jute type, but the staple is short.

The Yorubas and Haussas of West Africa employ it for a variety of purposes, chiefly in house building (*Kew Bulletin*, 1891, p. 219). In the German island of St. Thomé it is used for paper and cordage (*Der Tropenpflanzen*, Vol. IV. p. 562). In India it affords sacking, twine, and is used as a substitute for flax *(Dictionary of Economic Products of India)*.

The *Consular Report* on the trade of Rio de Janeiro for 1899 says, p. 23:—

'In the vegetable class are comprised many fibre producing plants which could probably be utilized in connexion with manufactures. One of these is guaxima, the fibre of which should be useful for cordage, and may possibly compete with jute as a material for the manufacture of sack-cloth. The threads are long and very strong and will resist the action of water, the fibre being used by fishermen on the coast for their nets, which last for years, particularly if soaked in a tincture of aroeira bark. A quantity of the fibre has been sent to Great Britain for experiments to be made as to its qualities and adaptability to industrial purposes.

'It must be borne in mind that the plant occurs only in a wild state and in scattered quantities, so that, even should it be proved to possess the necessary qualities, for industrial manipulation, there will be still the question whether it can be systematically cultivated to yield regular marketable supplies for manufacturing purposes at a cost which will allow it to compete with jute.'

Value of the Fibre. The *Kew Bulletin* for 1890, p. 198 contains the following note on samples from West Africa:—
'The fibres are probably worth £18 to £20 per ton, and the price is likely to be maintained at such a figure as would render a jute industry remunerative. It might be possible to get the natives to clean these fibres by hand and sell the produce in small lots locally.'

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—Sept. 2, 1902.—Messrs. J. Hales Caird & Co., Messrs. Gillespie Bros. & Co. and 'The Public Ledger,' August 30, 1902.

Aloes—Curaçoa 10/- to 40/-; Barbados 13/- to 35/- per cwt.
Arrowroot—St. Vincent, 2¼ to 4*d* per lb.
Balata—Venezuelan, 2/0¼ to 2/1 per lb.
Bees-wax—Jamaica, fair; West Indian 2/1½ to 2/5 £7 15*s* to £7 17*s* 6*d* per cwt.
Cacao—T'dad, 63/- to 71/- ℔ cwt.
Dominica 55/- to 57/- per cwt.
Grenada, good 56/- to 63/- per cwt.
Jamaica, 57/- to 60/- per cwt.
Cardamoms—Mysore, 1/- to 3/- per lb.
Cassia Fistula—5/6 to 35/- per cwt.
Castor Oil—4½*d* to 4¾*d* per lb.
Coffee—Jamaica, 31/- to 53/6; Peaberry 90/- to 100/6 per cwt.
Costa Rica, 46/- to 83/- per cwt.
Trinidad, 26/6 per cwt.
Cotton—Carriacou 4 11/16*d*. per lb.
Cowage—1*d* to 2*d* per lb.
Fustic—little offering.
Ginger—Jamaica, good bold 52/-; ordinary to good ordinary 38/- to 40/- per cwt.
Honey—fair amber 16/- to 17/- per cwt.
Isinglass—West Indian, good pale 1/2 to 1/3*d* per lb.
Jalap—4*d* to 6*d* per lb.
Khus-Khus Root—12/- per cwt.
Kola Nuts—1*d* to 4*d* per lb.
Lime Juice—Raw, 1/- to 1/1 per gallon; concentrated, £12 12*s*. 6*d* per pipe.
Logwood—No quotations.
Mace—10*d* to 2/6 per lb.
Nitrate of Soda—Agricultural £8 17*s*. 6*d*. per ton.
Nutmegs—80*s* @ 1/2, 60*s* @ 2/4, per lb.; in shell. 4*d* to 5*d* per lb.
Oil of Limes—Distilled 1/8; Hand pressed 4/- per lb.
Pimento—2 7/8*d*. per lb.
Sarsaparilla—Jamaica fair 1/3 to 1/4 per lb.
Sugar—Barbados Muscovado 10/9 to 11/6 duty paid; Trinidad and Demerara crystallized 12/6 to 14/9 per cwt.
Sulphate of Ammonia—Grey, 24 per cent., London £12 2*s* 6*d* per ton.
Tonquin Beans—9*d* to 2/6*d* per lb.
Fruit—Covent Garden Market ('Gardeners' Chronicle,' August 30, 1902.)
Bananas—7/- to 12/- per bunch.
Lemons—8/6 to 25/- per case.
Oranges—20/- per case.
Pines—3/- to 5/- each.

Halifax N. S.—'The Maritime Merchant', July 31, 1902.

Lemons—$4.00 per case
Molasses—Porto Rico 30c. to 31c., Barbados 24c. to 25c. per gallon.
Pine-Apples—$2.00 per dozen.

New York,—Aug. 22, 1902.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaicas, 85c. for firsts, 8 hand bunches 65c. to 70c.
Cacao—African, 13⅛c.; Caracas, 13¾c. to 14½c.; Jamaica, 10¾c. to 12c.
Grenada, 13c. to 13½c.; Trinidad 13c. to 14c. per lb.
Cocoa-nuts; Small Trinidads $12.00 to $13.00; Jamaicas $22.00 to $24.00 per M.
Coffee—Rio, good ordinary 5⅝c.; Jamaica 5¾c. to 6¾c. per lb.; Manchester grades 8½c. to 11c. per lb.
Ginger—8c. to 8½c per lb.
Pimento—5½c per lb.
Rubber—Nicaragua Scrap 50c. per lb; sheet 46c. to 47c. per lb.; Guayaquil Strip 43½c. per lb.
Sugar—Muscovado, 89°, 2⅝c. to 2⅞c.; Centrifugals, 96°, 3⅜ per lb.

INTER-COLONIAL MARKETS.

Antigua,—September 10, 1902.—Messrs. G. W. Bennett, Bryson & Co., Ltd.

Molasses—10c. per imperial gallon, package included.
Sugar—Muscovado $1.25 per 100lb.

Barbados,—Sept. 13, 1902.—Messrs. T. S. Garraway & Co., and Messrs. J. A. Lynch & Co.

Arrowroot—good quality, $3.50 per 100 lb.
Cacao—$13.50 per 100 lb.
Coffee—Jamaica and ordinary Rio $8.50, and $9.00 per 100 lb. respectively.
Hay—New Brunswick $1.00 per 100 lb.
Manures—Nitrate of Soda $60.00 per ton; Ohlendorff's Dissolved Guano; $60.00. Sulphate of Ammonia $80.00; Sulphate of Potash $70 per ton.
Molasses—No quotations.
Onions—Madeira $2.50 to $2.75 per 100 lb.
Potatos—$3.40 per 160 lb.
Rice—Ballam $4.60 per bag; Patna $3.75 per bag; Rangoon $3.00 per bag.
Shalots—10c. per lb.
Sugar—No quotations.

British Guiana,—Sept. 11, 1902.—Messrs. Weiting & Richter.

Arrowroot—$8.00 per barrel.
Cacao—native 11c. to 12c. nominal.
Cassava Starch—$7.00 per barrel.
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica 11c. per lb. (retail.) Creole, 11c. to 12c. per lb.
Eddoes—$1.44 per bag.
Onions—3c. to 3½c. per lb.
Pea Nuts—Curaçoa 3¾c.; American 5c. (retail.)
Plantains—24c. to 36c. per bunch.
Potatos English—$4½ to $5.00 per barrel.
Rice—Ballam $4.80 to $4.90 ex store; Patna $5.90 to $6.00 per bag—Creole Rice 20c. per gallon, (retail.)
Sweet Potatos—Barbados, none.
Tannias—$1.68 per bag.
Yams—$3.00 per bag.
Molasses—Vacuum Pan yellow 14½c. to 15c. per gallon, casks included.
Sugar—Dark Crystals $1.62½; yellow $2.10 per cwt.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—September 11, 1902.—Messrs. Gordon Grant & Co., and September 12, 1902.—Messrs. Edgar Tripp & Co.

Cacao—Ordinary to good red $12.75 to $13.00; estates $13.25 to $13.75 per Fanega.
Balata—Venezuelan. None.
Coffee—Venezuelan. $13.40 to $13.60 per Fanega.
Onions—$2.50 to $3.00 per 100lb.
Potatos English—$1.30 to $1.75 per 100lb.
Rice—Yellow $4.70; White Table $5.75 per bag.
Sugar—For Grocery use, $1.60 to $3.00 per 100lb.
Molasses—No quotation.

DEPARTMENT PUBLICATIONS ON SALE.

The 'WEST INDIAN BULLETIN.' A Quarterly Scientific Journal.

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The 'AGRICULTURAL NEWS' A Fortnightly Review, Subscription 3*s*. 3*d*. per annum, post free.

Agents for the sale of the publications of the Department :—

London: Messrs. Dulau & Co., 37, Soho Square, W. *Barbados:* Messrs. Bowen & Sons, Bridgetown. *Jamaica:* The Educational Supply Company, 16, King St., Kingston. *British Guiana:* The 'Daily Chronicle Office, Georgetown. *Trinidad:* Messrs. Munro, & Co., Frederick St, Port-of-Spain. *Tobago:* Mr. C. L. Plagemann, Scarborough. *Grenada:* Messrs. F. Marrast & Co., 'The Stores,' St. George. *St. Vincent:* Mr. W. C. D. Proudfoot, Kingstown. *St. Lucia:* Mr. R. G. McHugh, Castries, *Dominica:* Messrs. C. F. Duverney & Co., Market St. Roseau. *Montserrat:* Mr. W. Llewellyn Wall, Plymouth: *Antigua:* Mr. F. Forrest St. John's. *St. Kitts:* Messrs. S. L. Horsford & Co., Basseterre.

TO THE PLANTING WORLD.

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1. Tropical Seeds and Plants of Commercial Products, enlarged edition for 1902.
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A Foreign Agricultural Department writes dating 9th September, 1901:—"Please accept our order for 175 lb. of Tea seed and for 2,000 Coffee beans. In regard to Coffee seed I would say that this will be the first importation made by this Department, and we will leave the selection of the varieties to be sent to your judgement."

"SOUTH AFRICA."—The great authority on South African affairs of 25th March, 1899, says:—An interesting Catalogue reaches us from the East. It is issued by William Brothers, Tropical Seed Merchants of Henaratgoda, Ceylon, and schedules all the useful and beautiful plants which will thrive in tropical and semi-tropical regions. We fancy Messrs. Williams should do good business, for now that the great powers have grabbed all the waste places of the earth, they must turn to and prove that they were worth the grabbing. We recommend the great Powers and Concessionaries under them to go to William Brothers."

Agents in London: Messrs. P. W. Woolley & Co., 90, Lower Thames Street.

Telegraphic Address: William Henaratgoda, Ceylon.
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Total Assurances Issued	$11,752,403
Total Bonuses Declared (31 December 1900)	3,610,921
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Annual Income	245,345
Net Surplus December (31 1900)	297,124

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May 22, 1902.

H. J. INNISS,
Secretary.

Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. I. No. 13. BARBADOS, OCTOBER 11, 1902. PRICE 1*d*.

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Packing for Export.

THROUGHOUT the West Indies, an increasing number of people, year by year, take some part in raising and packing perishable produce for distant markets. All alike, whether interested in oranges, bananas, pine-apples, onions or sweet potatos, have the same object, the placing of their produce on the market in a sound condition. It is no easy task to accomplish this off hand. We must know the exact stage at which each kind of fruit or vegetable must be gathered in order to keep sound during its long journey, and arrive in England or America in the best state. We also have to learn how to treat the produce between picking and packing; the conditions necessary to allow 'ripening' to proceed during voyage, and to prevent chilling and rotting. On all these points knowledge has in the past been gained by experience, and the general precautions necessary for the successful export of fruit and vegetables are now fairly well known although, unfortunately, not always acted upon.

One point the experience of the past has clearly brought out, and that is, the absolute necessity of careful packing. A man may raise the finest oranges or pine-apples in the West Indies, he may gather them at the right moment, and handle them carefully, but, unless they are well packed, his trouble is to a great extent thrown away, for they are practically certain to arrive on the market in poor condition.

At the last Agricultural Conference the question of regulating the quality of exported fruit was brought forward by the Hon'ble Sydney Olivier, C.M.G., Colonial Secretary of Jamaica. He pointed out that bad packing was responsible for the disrepute into which some West Indian fruit was falling in the English market. 'All the buyers have been frightened off Jamaica oranges and will not touch them on any account' (*West Indian Bulletin*, Vol. III, p. 131).

Similarly with regard to pine-apples, his Honour H. Hesketh Bell writes: 'Pines in barrels are a by-word in Covent Garden market' *(Agricultural News* p. 164*)*.

That the fault lies with the packer and not with the fruit the recent very successful shipments of oranges, bananas and pine-apples from Dominica and Barbados, sufficiently prove.

The situation is exactly the same with regard to sweet potatos in the United States. As we show elsewhere in this number, one set of producers save some 50 cents per barrel in labour etc., in their packing, and, as a result, obtain about $1.00 per barrel less than those who pack carefully.

The question of packing is one demanding the careful attention of every exporter of fruit or vegetables from the West Indies, for if bad methods of packing are persevered in, their produce will fail to gain the confidence of the market and their industry fall to the ground.

SUGAR INDUSTRY.

Sugar-cane Experiments at Barbados.

In our last issue a summary was given of the more important results obtained from the sugar-cane experiments carried out in Barbados during the past season (see pp. 178-9). After stating the conclusions to be drawn from the manurial experiments and presenting a resumé of the tests with seedling and other canes, Mr. J. R. Bovell proceeded to discuss the much debated question of the comparative value of the Bourbon and the varieties of canes at present cultivated.

BOURBON VERSUS OTHER VARIETIES.

Mr. Bovell pointed out, (illustrating his remarks by means of a specially prepared coloured diagram) that for the thirty-five years, 1860 to 1894 inclusive, with an average rainfall of 60 inches, and an average annual application of chemical manure to the value of £56,000, the average yield of the Bourbon cane for the whole of Barbados was 1·366 tons sugar per acre.

During 1895 and 1896 the losses from the fungoid diseases were very severe, so that the yields for the two years must be discarded. From 1897 the Bourbon has practically been supplanted by other varieties of canes, and for the period 1897 to 1901 we find that with an average rainfall of 69 inches and the yearly application of chemical manure to the value of £70,000, the average yield of sugar for the whole island has been 1·350 tons per acre, or practically the same as that given by the Bourbon. These figures are summarized in the accompanying table:—

Period.	Canes cultivated.	Average annual rainfall.	Average annual application of manure.	Average yield per acre of sugar.
1860-94	Mainly Bourbon.	62 inches	£56,000	1·366 tons
1896-1902	Mainly other varieties than Bourbon.	69 „	£70,000	1·350 „

The question may be look at from another point of view. Supposing there had been no other varieties available to replace the Bourbon, what would be the average yield at the present day? For the past five years the Bourbon cane has been cultivated on the experiment plots, side by side with the other varieties and has given an estimated yield of 3,891 lb. of saccharose per acre, as compared with 6,936 lb. per acre, yielded by the White Transparent. On this basis the average yield of sugar from the Bourbon for the last five years would have been at the rate of 0·485 tons per acre.

The total sugar crop of the island at present, is about 47,000 tons, exclusive of about 5,000 tons, consumed locally. The Bourbon at the above estimate would give a total crop of about 17,000 tons.

BARBADOS RESULTS COMPARED WITH OTHER PARTS OF THE WEST INDIES.

After the conclusion of Mr. Bovell's address, Dr. Morris, the Commissioner of Agriculture for the West Indies, reviewed the general trend of the sugar-cane experiments, which are being carried on by the Department, not only in Barbados but also in Antigua, St Kitt's and British Guiana. He pointed out the close similarity between the results obtained in Barbados and in the Leeward Islands (see *Agricultural News*, pp. 35 and 36). In both Antigua and St. Kitt's, as in Barbados, B. 208 stood first in this year's experiments. White Transparent had done exceedingly well in Barbados, but in Antigua it was twentieth in order of yield. Evidently in B. 208 we had a very promising seedling cane worthy of careful trial. As Mr. Watts had said in his report, 'B. 208 presents several good qualities; the juice is exceptionally rich; the cane is one which we can recommend with some degree of confidence, always remembering that caution is necessary in the introduction of any new variety of cane.'

Jack-in-the-Box Tree.

On page 119 of the *Agricultural News* we noted that the Rev. H. Hutson has drawn attention to the occurrence of this plant in Turner's Hall Wood, Barbados. Mr. C. T. Murphy the master of Turner's Hall school, a keen agriculturist, writes:—

Before the hurricane of 1898 a large 'Jack-in-the box' tree was to be found in Turner's Hall wood, but was blown down, and at present only a few young trees occur near where it stood. Should they flower I will try to obtain and forward specimens of the flowers, etc. for the indentification of the species.

COTTON GROWING IN ANTIGUA.

VALUATION OF SAMPLES IN ENGLAND.

As an outcome of the experiments made with cotton in the Leeward Islands (see *Agricultural News*, pp. 153 and 169) four samples grown at the Economic Experiment Station, Antigua, were forwarded to England for valuation.

The varieties sent were 'Sea Island, 'King's Improved,' 'Peterkin,' and 'Russell's Big Ball. All had been grown from seed imported from America and ginned in a Macarthy hand power gin, obtained from Messrs. Platt Bros., of Oldham.

The Secretary of the Manchester Chamber of Commerce, who was good enough to obtain expert opinion on the samples, reports as follows:—

'I have submitted the samples of Antigua cotton referred to in your letter of June 18, and its enclosure, to the judgement of a competent expert who, after careful examination of them reports to me in the following terms:—

"The four samples of cotton grown in the island of Antigua are valued as follows:—

Sea Island	$8\frac{1}{2}d.$	nominal
King's Improved	$4\frac{5}{8}$-$\frac{3}{4}d.$	nominal.
Peterkin	$4\frac{1}{2}$-$\frac{5}{8}$d.	,,
Russell's Big Ball	$4\frac{3}{8}$-$\frac{1}{2}d.$	,,

The sample of Sea Island is well thought of, but has not been prepared to the best advantage. A roller gin would be more suitable for such long stapled cotton. In the most favourable circumstances this cotton might be worth about 1*d.* per pound below the best Georgias grown from similar seed in America, but would only rank as a substitute, and there is very little demand for substitutes unless the American Sea Island crop proves a small one. The best market would be found in Savannah.

The other three varieties are very ordinary cotton."

I shall at all times take pleasure in assisting you to the best of my ability in your endeavours to extend the growth of cotton.'

The prices quoted are slightly in advance of those given on page 103 of the *Agricultural News* for samples of cotton from Montserrat.

COTTON SEED AND ITS BY-PRODUCTS.

The following extracts taken from Mr. W. Henry's work, *Feeds and Feeding*, and from *The Cotton Plant* by Charles W. Dabney, Ph. D., Assistant Secretary, Department of Agriculture, United States of America, afford useful and reliable information with regard to the value of cotton seed and its products, cotton seed meal and cotton seed hulls, both as a stock food and as a fertilizer.

It is estimated in the United States that for each pound of cotton lint, there are produced 2 lb. of cotton seed, or in the ratio of 1 to 2. This agrees with the results recorded in the West Indies. On the assumption that 900 lb. of raw cotton can be produced per acre in these islands, there would remain, after removing the lint, about 600 lb. cotton seed. According to Mr. Henry, the value of cotton seed as a stock food and also as a fertilizer is as follows:—

COTTON SEED AS A STOCK FOOD.

100 lb. of cotton seed meal contain in digestible nutriments:—

Protein	37·2 lb.	Protein	223·2 lb.	per acre.
Carbohydrates	16·9 ,,	equal to Carbohydrates	101·4 ,,	
Ether extract	12·2 ,,	Ether extract	73·2 ,,	

While 100 lb. cotton seed hulls contain in digestible nutriments:—

Protein	0·3 lb.	Protein	1·8 lb.	per acre.
Carbohydrates	33·1 ,,	equal to Carbohydrates	198·6 ,,	
Ether extract	1·7 ,,	Ether extract	10·2 ,,	

COTTON SEED AS A FERTILIZER.

Cotton seed meal contains per 1,000 lb:—

Nitrogen	67·9 lb.	Nitrogen	136 lb.	per ton.
Phosphoric acid	28·8 ,,	approximately equal to Phosphoric acid	58 ,,	
Potash	8·7 ,,	Potash	18 ,,	

Cotton seed hulls contain per 1,000 lb:—

Nitrogen	6·9 lb.	Nitrogen	14 lb.	per ton.
Phosphoric acid	2·5 ,,	approximately equal to Phosphoric acid	5 ,,	
Potash	10·2 ,,	Potash	21 ,,	

It is also stated that 100 lb. of cotton seed yield:—

Cotton seed meal	37·5 lb.,	or about	225 lb.	per acre.	
,, ,, oil	12·5 ,,	,,	75 ,,	,,	,,
,, ,, hulls	48·9 ,,	,,	293 ,,	,,	,,
Short lint	1·1 ,,	,,	7 ,,	,,	,,

The 'short lint' is the small portions of lint left on seed after ginning.

MANURING COTTON.

With regard to the kind of fertilizer best suited for the cotton plant, opinions vary in different parts of the United States where cotton is extensively grown. As cotton lint, however, on analysis, is found to possess only a trace of nitrogen and mineral matter, whilst the seed is especially rich in these constituents, it may fairly be assumed that where cotton seed is not restored to the land in the form of manure, the application of a fertilizer containing these ingredients is necessary to maintain the fertility of the soil. So far, the best results appear to have been obtained with chemical manures applied per acre in the following proportions, taking the crop at 300 lb. of cleaned lint per acre:—Nitrogen, 20 lb.; phosphoric acid, 50 lb.; potash, 15 lb. On the other hand, when cotton seed, or portions of it, are returned to the soil, the most satisfactory yields per acre are said to have been obtained from applications of the following compost:—

Green cotton seed	100	bushels.
Stable manure	100	,,
Acid phosphate	2,000	lb

applied at the rate of 400 to 800 lb. per acre.

LIMES IN GRENADA.

The Grenada *Federalist* reports that at the recent meeting of the managing Committee of the Agricultural Society, the question of planting the Spout land in limes took place.

'It was urged that the lime industry was likely to prove a valuable assistant to cacao and spices, and that an object lesson was necessary to enable peasant proprietors to have some idea of the method of cultivation and a knowledge of the value of the product. Lime fruit had been recently selling locally for export, at very good prices which were more remunerative than anything that cacao could bring, and it was urged that the systematic cultivation of this plant, would, therefore, be of very great benefit to the community. A vote was agreed to for cultivating one acre of the Spout lands in limes.'

WEST INDIAN FRUIT.

GRAPE CULTIVATION AT JAMAICA.

LECTURE TO TEACHERS.

In a previous number of the *Agricultural News* (p. 156) was published an outline of the course of practical instruction in agriculture to teachers at the Mico Training College, Kingston, Jamaica. To-day we reproduce from the *Gleaner* of August 9, last, the summary of a lecture delivered by the Rev. W. Griffiths on Grape Culture :—

Mr. MacFarlane introduced the lecturer as the man who was admittedly the best authority in Jamaica on the subject with which he was to deal. He had been described by Dr. Morris, the head of the Imperial Agricultural Department as 'the grand old past master of the science and art of grape culture.'

Mr. Griffiths said that the grape, though not a tropical plant, adapted itself to the tropics when not grown too far from above the sea level, and repaid in ample harvest the skill and care bestowed upon its cultivation. Of late years a great deal of attention had been given to grape culture in Jamaica, but not more than enough grapes were grown to meet local needs in limited areas. It might be possible to grow grapes of such a quality as would command a market in America at something like the prices realized there for English hot-house grapes, but such grapes as were offered for sale in Kingston would certainly not find that market. He had never yet seen a properly ripened cluster of black grapes offered for sale here. White grapes had made a better showing, and in recent years there had been a marked advance in the quality of both kinds. The fall of the year and the early spring were probably the only periods when it would pay to ship grapes to the States, and those were just the times when we had practically none; but careful cultivation might result in the discovery of an early grape which could be accelerated, or a late grape which could be retarded to meet the market conditions on the other side. There was always more or less of a local demand for good grapes, but not a large one, and the market for grapes at ruling prices was soon overstocked.

Mr. Griffiths spoke in high praise of the 'White Muscat of Alexandria' which is far and away the most popular grape in Jamaica, and said that it was deservedly a universal favourite. Our black grapes were not popular because they were never allowed to ripen properly. They should be left on the vines six or eight weeks after the berries were fully coloured, but as a rule they were cut and offered for sale as soon as the colour showed. The fault of the unpopularity rested on the grower, not on the grape. As to localities suitable for grape culture, it was generally agreed, though, not perhaps an absolutely established fact, that grapes cannot be properly grown far from the sea level and that for some reason they prefer to be near the sea. He had seen good crops of black grapes at Ewarton however, and he would be willing to risk planting healthy varieties anywhere where there was a good south or south-easterly aspect, where the soil was a fair garden loam with good natural drainage, and the roots could be kept near the surface so as to get all possible benefit from light, air, and sun.

The lecturer gave detailed advice as to the planting and culture of the vine and strongly advised amateur vine-growers not to be afraid to thin out their fruit. 'White Muscat Alexandria' sometimes needed very little thinning, but some varieties, such as Royal Ascot, could well spare 75 per cent. of their berries. 'Very few except experienced hands', said Mr. Griffiths, 'have the moral courage to thin to this extent.'

After the lecture a number of questions were ably and interestingly answered, and the proceedings concluded with a well-deserved vote of thanks to the lecturer.

CACAO IN ST. LUCIA.

Mr. Geo. S. Hudson, the Agricultural Instructor, contributes the following interesting notes on cacao cultivation in St. Lucia :—

The cacao crop promises fairly well. The first main crop pickings have already commenced, but the crop is a peculiar one. We have a small quantity of large ripening pods, and then an almost complete break in the crop, of a month or six weeks (corresponding with the very wet season experienced from May 24 to July 6), and then a large quantity of small pods, from July and August flowers, which will ripen mainly in December and January next. On the whole the crop promises somewhat better than it did this time last year.

MANURING CACAO.

At the September monthly meeting of the Soufrière Agricultural Society a useful paper was read by Mr. Wm. M. Smith, manager of Union Vale estate, on this subject, which it was decided to publish together with some notes by the writer on 'Artificial Manures for Cacao.' The concrete points argued in these papers are :—

(1) That stable or pen manure is best preserved (for about three months) in a covered pit 4 feet deep, with a good layer of straw at the bottom to absorb moisture, and

alternate layers of manure, straw and dry earth, watered daily with urine and stable washings collected in a receptacle from stables floored with concrete.

(2) That such manure should be applied broadcast over the whole surface of adult plantations and lightly forked in.

(3) That artificial manures have in many cases proved more efficacious and cheaper than natural manure.

(4) That basic slag at the rate of 5 to 10 cwt. per acre, applied in December or January, followed by 1 cwt. of sulphate of ammonia the following August or September has given the best results in St. Lucia and also Grenada, on the experiment plots worked by the Imperial Department of Agriculture. The cost of such applications would be from £2 10s. to £5 per acre. The results in increased crops have justified the expenditure several times over.

(5) Nitrate of soda, 1 cwt. per acre, is clearly indicated in the attacks of *Diplodia* and other diseases where the foliage is first affected.

(6) Bone meal, about ½ lb. to each hole, is the most satisfactory application when young plants are being put out.

SEEDLING ONIONS.

The following hints were contributed by Mr. A. J. Jordan, Agricultural Instructor at Montserrat, to the *Montserrat Herald*. They afford useful information to those who may have found difficulties with the small seedlings. Fuller particulars are to be found in Pamphlet No. 16, *Hints on Onion Cultivation*, to be obtained from all local Agents of the Department, price 2*d*.:—

The weather in Montserrat has been too dry for sowing in situations where no water can be obtained; but it is possible still to raise plants which will give onions at a time when the market is most favourable to the producer.

A spot of land might be selected close to the house or near water, where attention can be given morning and evening. A bed might then be made, using well rotted manure and breaking up the soil very fine, and the seeds sown in drills (rows) 6 inches apart. The seed could, in these drills, be sown thickly so that six or eight plants could be obtained to the running inch. A little trash spread over the beds after they are sown will do much to keep them cool and moist; but the trash must not be put on heavily.

When the young plants are about half the size of a lead pencil they may be taken up with as much root as possible, and transplanted into permanent positions. This operation should, of course, be performed when the rains set in, on a wet day for preference.

It will be seen that a comparatively small bed thus sown will give plants sufficient to plant a relatively large area, for in the bed the plants will be, say, seven to the inch in rows 6 inches apart, while transplanted into a plot with rows a foot apart they will be put 4 inches from each other, and if planted in a catch crop in a cane field you will put nine plants to a running foot of the cane-bank; the banks will of course, be 4 feet apart.

VANILLA CULTIVATION.

The main portion of Mr. J. S. Galbraith's excellent account of *Vanilla Cultivation in the Seychelles* has already appeared in this Journal (see pp. 67, *et seq.*) We did not however reproduce the last chapter of the original Bulletin, headed 'Miscellaneous information and notes.' From this we take the following extracts of interest to cultivators in the West Indies:—

A fair crop should average about 100 cured pods to the pound.

	Pods per pound.	
	Fresh gathered (about)	Dry (about).
9-inch pods	20	65
8-inch pods	25	80
7-inch pods	33	110
6-inch pods	50	160

VARIABILITY OF YIELD.

The following crops, produced on one estate will serve to show how uncertain are the returns from vanilla growing here:—

	Pounds.
1893 (long dry spell for flowering time in 1892)...	...1,800
1894 (rain came too soon and spoiled good promise) ...	120
1895 (next to no dry spell for flowering in 1894) ...	40
1896 (excellent promise mostly spoiled by too early rain)	500
1897 (similar to the year before)	600

PALMS AS SUPPORTS.

Straight-stemmed palms, if stout, may be used for supporting the vanilla vines. By driving hard-wood pegs into them obliquely at suitable heights the vines can be hung about them as in tree forks.

FLOWERING OF CUTTINGS.

When long vanilla cuttings are planted near blossoming time, some of them often give flowers soon afterwards. It is best to cut these off, as cropping a vine when newly planted lessens the growing power, and it may hang for many months, but in a regular plantation vines flowering too heavily may be relieved by cutting off one or more of the flowering branches. These may be planted for the one small crop they will give—3 or 4, or up to 10 or 12 pods, according to length and vigour. For this they may be planted close together on low bars and posts, and need well-rotted manure for immediate and abundant nourishment. The best time to plant for this is a few days before the first flowers open; if cut earlier many of the flowers will die back.

Cropping branches may be allowed to flower for two years if they have not missed a season, but never more than that, as the pods they then give are invariably very inferior; the best are on young wood a year or so old at flowering.

PRUNINGS.

Prunings, when not too old, may be set out to rear new plants from. When extending the plantations it is better to plant the shoots from the prunings rather than the prunings themselves, if they are over two years old. If flung into jungle, especially among rough ground, rocks, etc., where there is shade and decayed leaves, they grow in a wonderful way without any attention and yield the best of cuttings. When shoots are checked for cropping branches, some of their tendrils occasionally elongate into ærial roots, and should then be cut off, or they will keep the branch full of sap and hinder its flowering.

GRASS AND WEEDS.

Short varieties of grass seem rather beneficial in a plantation; cumbersome weeds should be hand pulled, never hoed.

(To be continued.)

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the **Commissioner, Imperial Department of Agriculture, Barbados.**

It is particularly requested that no letters be addressed to any member of the staff by name. Such a course may entail delay.

Communications should always be written on one side of the paper only. It should be understood that no contributions or specimens will, in any case, be returned.

All application for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 208 of this number.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News

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NOTES AND COMMENTS.

Bourbon versus Other Varieties of Cane.

It is not infrequent to hear the newer varieties of sugar-cane contrasted unfavourably with the Bourbon. In this connexion the data recently put before the Barbados Agricultural Society by Mr. J. R. Bovell are of great interest (see p. 194) It would appear that the average yield of sugar of the newer varieties is very little different from that of the Bourbon before it was overcome by disease. The figures referred to apply of course solely to Barbados, and it would be interesting if a similar, exact comparison were made in Antigua and St. Kitt's, the other islands in which the replacement of the Bourbon by other varieties has been most complete.

Seedling Canes D.74 and D.95.

The two Demerara seedling canes, known as D. 74 and D. 95, have done extremely well in some parts of the West Indies. Their success has not been confined to these Colonies, for the *Louisiana Planter* of September, 6 says: 'These canes show high sucrose, large tonnage, are drought proof, extraordinary stoolers, vigorous growers and fine stubblers.'

Cotton Growing in the West Indies.

Samples of four varieties of cotton grown in Antigua during the past season, part of the experiment work of the Department, were, as recorded on page 169, sent to England for report. The detailed valuation is given in this number (p. 195) As in the case of the Montserrat samples, the Sea Island cotton has proved by far the most valuable.

Through the kindness of a correspondent we have received an original account sale of some cotton sent from Barbados in 1864 and the difference in the market value of cotton now, and less than forty years ago is interesting. Three bales containing 8 *cwt.* 1 *qr.* 7 *lb.* of cotton, fetched in the public market £128 0*s.* 3*d.*, the sale price being no less than 2*s.* 9*d.* per lb. After payment of all charges for freight, etc., the grower received £117 16*s.* 3*d.* To-day he would receive perhaps £25, and yet even at this comparatively low rate, the cultivation of cotton in the West Indies would yield a profit of £1 to £2 per acre in all probability. It must be borne in mind that cotton seed is no longer the 'waste product' it was formerly regarded.

In addition to the experiments of the Department in Antigua, Montserrat, and St. Lucia, two planters in Barbados have already obtained seed, and intend to give cotton a trial.

Precautions against Surra Disease.

At a meeting of the Agricultural Society of Trinidad on September 9, the warning issued by the Imperial Department of Agriculture with reference to the possible importation of Surra disease was discussed. The Government Veterinary Surgeon pointed out the serious nature of the disease and recommended that steps should be taken to prevent the introduction of American animals into the colony. From the remarks of Mr. Meaden, Manager of the Government Farm, it would appear that in Trinidad there is no legislation affording protection against any animal disease except glanders. A committee was finally appointed to bring the matter before the local Government.

The Colonial Secretary of the Leeward Islands ha sinformed the Department that 'necessary action has been taken to guard against the introduction into this colony of the disease.'

Manuring Cacao.

The conclusions stated on page 196 with reference to the manuring of cacao are worthy of the attention of planters of this crop. They embody results arrived at, in part on estates in St. Lucia, and in part on experiment plots of the Department in that island, and also in Grenada.

The Value of Good Packing.

In our last number we quoted a *Farmer's Bulletin* of the United States Department of Agriculture, with regard to the necessity of carefully packing produce for export. Two principal varieties of potatos are put upon the American market: 'Southern Sweets' and 'Jersey Sweets.' These names are not now indicative of the localities where the potatos are grown. As was explained on page 182, the 'Jersey Sweets' originally came into high repute on account of the care taken in putting them on the market. 'Those who ship Southern Sweets from whatever section give little or

no attention to grading, and their stock reaches market abraded and bruised from jolting in loosely filled barrels.' The packers economize in various ways, to the extent of 50 cents, and as a result lose $1.00 on each barrel.

To quote further from the *Bulletin:* The essential point is that the Southern man can produce as good potatos as the Jersey man, and at as small cost. When nature has done her part for both, one goes to work in a systematic way, separates his marketable potatos into two sizes, packs them carefully in full-sized barrels, puts in a wooden head under pressure, stencils his initials on the barrel, sends it to market and puts money in bank. The other is careless in his packing. He saves something on barrel, cover, labour, and potatos, but on the whole operation, when he strikes a full market, he loses time, labour and money. But the market is not always low, so he does not always lose money on a year's operations.'

Crated versus Uncrated Bananas.

In his Annual Report for 1901-02 of the Dominica Botanic Garden, Mr. J. Jones the Curator records the following interesting experiment. In August [1901] a trial shipment of fifty bunches of bananas was made, under the direction of his Honour the Administrator, to London, per Royal Mail Steamer via Barbados, with the view of discovering whether bananas cut at the right stage would reach the market in good condition. Twenty-five of the bunches were crated and the remainder wrapped in banana trash to protect them while being handled and during transhipment. The crated bananas arrived in good order and realized from 6*s.* to 6*s.* 6*d.* per bunch at a time when the market was glutted with fruit of all kinds. The uncrated bunches showed considerable wastage. The highest price obtained for the best of these was 4*s.* per bunch.

The experiment with the crated bananas was very successful. The fruit was spoken of as being of good quality; and it shows that bananas cut at the right stage and carefully packed can be placed in good order on the London market even during the hottest months of the year.

The Work of Travelling Instructors.

Amongst our 'News from the Islands' in this number, two instances are given of the work which is being done by the Travelling Instructors of the Department. The duties of these instructors are to travel in the country districts, and demonstrate, practically, sound methods of cultivation and to assist the people generally in their efforts to obtain a living from the soil. The value of such Instructors has long been recognized, and they are now to be found in almost every island in the West Indies. Trinidad has recently decided to adopt their services and two Travelling Instructors have been appointed for that Colony within the last few months.

West Indian Trade with Canada.

The *Maritime Merchant* for August 14, last, prints an interesting interview with Mr. Charles Pickford of the Pickford and Black Steamship Company, who has paid several visits to the West Indies to study trade conditions. Whilst frankly seeking, in the first place, to improve Canada's trade, he points out that 'the only thing standing in the way of our [Canada] securing as much of the trade as we want is the question of sugar imports. . . . It is uphill work to do business in the West Indian market unless you are prepared not only to sell but to buy.'

The same view is expressed in the resolution passed at the Canadian Manufacturers' Association, reprinted on page 201. We trust the practical result may be an extended market for West Indian sugar.

Feeding Poultry.

The attention of all interested in poultry keeping is directed to the articles, in this and our last issue, on 'Feeding Poultry,' by Mr. John Barclay of the Agricultural Society, Jamaica. The haphazard methods often adopted and the use of wrong foods are the cause of much waste of money, and of a considerable share of the comparative failure many people experience with poultry.

Mr. Barclay points out that Indian corn alone is not a good food but contains too much fat and starch in proportion to flesh-forming materials. Its use in excess is often the cause of death from 'apoplexy.' His advice with regard to planting waste ground in pigeon peas, etc., seems a good one, and, as he says, should result in enrichment of the land in additoin to keeping the fowls in a healthy condition.

Black Blight in Grenada.

Black Blight appears to be attacking trees in Grenada on a more serious scale than usual, and the pest is spreading along the Leeward Coast. More accurately, the scale insects of Grenada are becoming more abundant and are showing themselves by an evident increase in the black blight that so constantly follows the attack of certain species. Such an attack can be met only in one of two ways: either the owners of affected trees must treat them, using a spraying machine to kill the scale insects, or the trouble can be fought on a large scale with a properly equipped spraying outfit. In any case, the work necessary is probably more arduous and costly than is warranted by the value of the trees.

This attack emphasizes very strongly the need of regulations to prevent scale insects being introduced. The scale insects attacking mango and breadfruit in Grenada are *introduced species* brought from outside the West Indies on plants. They are now established in the island and it will not be easy to check them, nor will regulations now made be of value as regards these species, but regulations will serve to keep out others. There are very many scale insects not yet introduced which are likely to be far worse than those already introduced, and the present state of the trees in Grenada may serve to bring this home to the minds of all who see them. It is to be hoped that the attack will lessen, as the enemies and diseases of these scale insects increase sufficiently to check them.

INSECT NOTES.

The Grenada Maribunta.

The word 'Maribunta' or some corruption of it, is commonly used in the West Indies to denote an insect which would in England be known as a wasp. The Maribuntas are social wasps, building paper nests on trees, and having a venomous sting wherewith they defend themselves from meddlers. Several different species are included under the one name. The Grenada species, *Polybia occidentalis*, is a small black and yellow insect, building large enclosed nests hanging from the branches of trees and shrubs. Some five nests have been received from Mr. W. E. Broadway who says:—'This small wasp is unusually prevalent at the Botanic Station and elsewhere in Grenada at the present time. I have never seen so many nests hanging about trees and shrubs. We destroy them where the public have access, otherwise they deserve protection, according to Archdeacon Gentle, for the large number of caterpillars they kill.'

Though this is probably the first observation of the usefulness of this species, the other members of this group have long been known to play a useful part in feeding on caterpillars and other insects. The different species deserve to be protected whenever possible, as a number of nests scattered about a garden or field will do much to keep pests in check, and will certainly amply repay the unpleasantness of having them as near neighbours.

The Maribuntas generally are well worth careful observation. The social habits, the habits of the queen and drone, the form of the nest and the size and length of life of a colony are all points on which information is lacking. Two species of the allied genus *Polistes* are known in Barbados under the name of 'Wild Bee' and 'Cow Bee,' and a third is very abundant in the Botanic Station at Dominica. These species build smaller nests, open below, and the colonies do not become so extensive as do those of the Grenada Maribunta.

Insects Attacking Sweet Potatos.

Specimens of sweet potato plants attacked by red spider have been received from Mr. H. E. Thorne of Sandy Lane, Barbados. This is the first case of this pest recorded this year. During 1901 the sweet potato fields suffered heavily from red spider and many cases were seen in different parts of the island. The characteristic features of the attack are, first the plants turning yellow and then the falling off of the leaves and the death of the plants. If the crop is young there is loss owing to the small amount of tubers produced. If the attack does not become serious until after the potatos have been formed, as in this case at Sandy Lane, there may be little or no loss. Remedial measures depend wholly on meeting the attack in time, and if adopted promptly will prove effective and not costly. The remedies tested, and recommended in the 6th Lecture to Planters (Barbados) October 1901, were, spraying with kerosene emulsion and dusting with a mixture of lime 4 parts, flowers of sulphur, 1 part. Either of these will prove successful, and if adopted immediately the attack commences, will be found so simple and inexpensive as to be well worth employing.

A New Remedy for Clothes Moths.

One of the most destructive insect pests in the West Indies is the clothes moth which is extremely difficult to keep in check. Moth balls, camphor, etc., are of some service in deterring the female moths from laying their eggs, but they possess no killing power whatever. If the eggs have already been deposited, the young grubs (larvae) feed after hatching as though there were no moth balls or camphor present.

Carbon bisulphide will not only keep the adults away, but it will destroy all stages of the pest infesting the goods. A good plan is to place all woollen articles of clothing in a trunk with a shallow vessel such as a saucer or a plate holding two or three ounces of the liquid on the top, and then to tightly close it. In a short time the fumes of carbon bisulphide penetrate the contents of the trunk killing any moth, grub or eggs that may be in the clothing.

After remaining a day in the trunk the articles may be taken out, placed in the sun for a few hours and then returned to the wardrobe. The operation should be repeated every two months when no damage from moths need be feared. The most delicate articles are uninjured by carbon bisulphide. On account of its inflammable nature, no light should be brought near this substance or the trunk containing its vapour. If the treatment is commenced in the early morning the fumes will have largely disappeared before night. As continued breathing of the vapour of carbon bisulphide is liable to produce headache and dizziness, the operation of placing the liquid inside the trunk should be performed quickly, and it would be further advisable to place the trunk in a spare room on the leeward side of the house. [*Farmer's Bulletin*, No. 145, U.S. Department of Agriculture].

Mealy-bug in Trinidad. Specimens of a mealy-bug on cacao pods in Trinidad have been received from Mr. J. H. Hart, F.L.S. They have been determined as *Dactylopius citri*, a species also found on cacao pods in Grenada. Mr. Hart remarks that ants cover the mealy-bugs over to protect them, and this is frequently observed in Grenada. A somewhat similar case was noticed by Dr. Longfield Smith in Barbados where ants had raised a covering over the entire base of some plants as a protection to mealy-bugs of the same species.

Usefulness of Game Birds. The great abundance of game birds in England is one of the causes of the small numbers of insect pests there. Ground doves, wood doves, the Barbados blackbird and other ground-feeding birds should be encouraged in the West Indies to do the useful work of the partridge and other birds in England.

VOLCANIC DISTURBANCES IN ST. VINCENT.

REPORT ON DAMAGE TO CROPS, ETC.

At the request of his Honour the Administrator, Mr. H. Powell the Curator, and Mr. Thos. Osment, the Agricultural Instructor, of theBotanic Station, St. Vincent, visited the allotments on the Linley estates on September 6, for the purpose of ascertaining the extent of the damage to provision crops there by the eruption of the Soufrière on the night of September 3. Leaving Kingstown by boat early on the morning of the 6th. the effects of the eruption were first visible a little south of Cumberland, vegetation presenting a greyish appearance due to a coating of volcanic ash which was found of increasing depth as they proceeded from Cumberland to Troumaca. The party landed at Rosebank where the layer of ejecta was found to be about three inches thick and composed of dark ashes or sand and coarser material approaching the nature of gravel, with pieces of pumice measuring five inches in diameter and less, and pieces of stone from a quarter-inch to one inch in diameter, occasionally larger. Both at Rosebank and the surrounding villages it was observed that the crops had suffered more or less severely. The Curator and Instructor advised the settlers as to the best course to pursue with crops that were not past recovery. In the case of bananas nearing maturity, they recommended that the leaves should be carefully pruned and the ejecta removed by means of a pointed stick and a bucket of water. This course had proved satisfactory elsewhere, whereas ashes when allo remain in the axils of the leaves and branches ca ture decay. Tannias particularly had suffer breadth and tender nature of their leaves ejecta was found to have been much people, as also their story that the been destroyed. As a result of Powell and Osment arrived at which are embodied in their re

'(1) Scarcely any damag supply of provisions in conseq fit to reap.

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'(3) From Rosehall Villag compared to the

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'In conc misfortune sh and we also w calamity shou short time di

TRADE BETWEEN CANADA AND THE WEST INDIES.

The *Maritime Merchant* for August 14, last, records that at the thirty-first Annual Convention of Canadian Manufacturers' Association, held in Halifax on August 13-14, the following resolution was passed:—

Whereas, the Manufacturers of Canada desire to increase their export trade with the British West Indies, and

Whereas, the report of the President and Assistant Secretary of this Association submits the assurance that the agricultural and manufactured products of Canada are suitable to the requirements of the British West Indies, and

Whereas, the United States at present supply those articles largely because it buys considerable quantities of British West India sugar, and

Whereas, the diverting of this export trade from New York to Canadian ports might be accomplished by increasing our direct importation of India sugar,

Therefore Resolved effort by such me Executive t of s

POULTRY.

Mr. J. Barclay completes in this number his notes on 'Feeding poultry,' commenced on p. 186. The next contribution will deal with 'Housing poultry':—

MIXED DIET ESSENTIAL.

We have seen in the preceding article that corn is not a suitable food to be used alone, or even largely, in warm climates, owing to the large amount of fat it contains, over and above being rich in starch (also fattening) and in proportion, being poor in the flesh-forming element which goes to build up the body and be utilized in making the eggs. Cocoa-nut is also fatty but has no [illegible] must be used sparingly for laying fowls. [illegible] used in parts of Jamaica for feeding [illegible] both are suitable, fed sparingly, [illegible] of other food. When [illegible] as they should [illegible] fatten- [illegible] nut,

the pigeon pea cultivation, which may be done by feeding them there in the morning; they will spend busy and satisfactory hours getting at the lower pods, and nothing that falls will be wasted. The topmost pods will be saved and used in the house or stored for poultry feed, or both. When the crop is taken off, the pigeon pea bears a second time, sometimes a third time without replanting, but by the second year the soil is much improved by the pea-roots and the droppings of the fowls, and is ready to be planted in some other crop. Peas cost more than corn if bought in the markets, but when we consider that peas contain exactly a fourth less fat than corn,—fat which we do not want and which is therefore wasted to us,—and that one-fourth of their whole weight is flesh-forming food, which we value most highly, while corn contains only one-fourth as much, we find that one half-pint of peas will give as much flesh-forming food as a quart of corn. Furthermore, as we have seen that nearly all our other foods are starchy, it is possible by feeding a small proportion of peas every day with any other common foods, with what the fowls pick up, to get a well balanced and economical diet for our poultry.

AN ECONOMICAL METHOD.

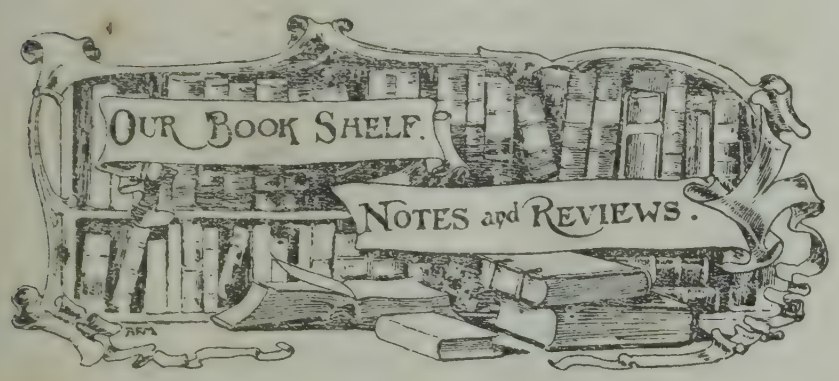
What we advise to do is as follows. There is to be found in most kitchens an old kerosene tin where yam-peelings and scraps generally are thrown, intended for the pigs. This is well, but in addition, a tin, or box should be fixed upon the wall, out of reach of dogs and fowls, should they happen to be allowed to hang around the kitchen (a bad custom), where the best scraps, such as bits of boiled yam, potato, breadfruit, crusts of bread, or in fact anything left [illegible] the cooking or from the table, should be thrown. [illegible] these scraps should be put into a dish (the [illegible]bba' of Jamaica makes an excellent and [illegible]) a handful of rice, bran, cornmeal, [illegible]ocoa-nut meal put in, and just enough [illegible]s to make a thick, crumbly mess, [illegible]This should be fed to the fowls [illegible]hes or on boards, not thrown on [illegible]e fed at the kitchen door or in [illegible] on different spots each day. [illegible]ar later on under 'Sickness'. [illegible]ffee walk, banana walk, or [illegible] an ounce or a little more of [illegible]h fowl, (depending upon [illegible]ng more until evening. [illegible] fowls will not go in [illegible]nd the yard or in the [illegible]eon peas cracked or [illegible]y in a mill, to a [illegible]ient food for from [illegible] that is, about an

[illegible] and wide, two [illegible] be kept busy [illegible]ow down the [illegible] quickly. In [illegible]; they scrape [illegible]nce it is best [illegible]r grain food. [illegible]ry, to produce [illegible] morning and [illegible]y after a long [illegible]ly assimilated [illegible]and go to the [illegible] time the food [illegible]ep them from

seeking more for themselves. Hard grain would take several hours to digest sufficiently for the hens to get any good from it; that is why it is to be fed in the evenings to last them as long as possible during the night.

It is very easy to know whether the hens have had a sufficiency of food to go to roost with, by feeling their crops as they roost. If their crops are half empty, feed a little more, if too full and distended, feed less.

The feeding of chickens will be dealt with in a special article, 'Chicken Rearing.'



CHECK LIST OF THE FOREST TREES OF THE UNITED STATES, THEIR NAMES AND RANGES. By George B. Seedworth. *Bulletin No. 17, Division of Forestry, U.S. Department of Agriculture.*

On account of the confusion in nomenclature regarding the forest trees of the United States, especially those of economic importance as sources of timber, the Division of Forestry has issued this bulletin so as to pave the way to a more definite system of naming commercial timber trees in that country.

The bulletin consists of a list of North American timber trees, arranged in families, giving the scientific name and the common name as well as the distribution of each in the various states.

There are several West Indian trees mentioned that are found in Southern Florida. Although not of high scientific value, the list will be useful for reference to those who are interested in the timber trees of the American continent. The list of the common names is possibly the most complete yet published.

THE NATURAL HISTORY OF PLANTS. By Professor Kerner Von Marilaun, English translation by Professor F. W. Oliver. *New and Cheap edition Messrs. Blackie & Son, 50 Old Bailey, London, E.C. 16 parts at 1s. 6d. each.*

As has already been noticed in the *Agricultural News* (p. 123) a new edition of Professor Oliver's English translation of Kerner's *Natural History of Plants* is being issued by Messrs. Blackie & Son. We regret very much that since the issue of the first English edition in 1897, the venerable author, Professor Kerner von Marilaun has died.

The new edition is published in monthly parts at 1*s.* 6*d.* each and will be completed in sixteen numbers. The chief difference between this and the first edition (published in 16 parts at 2*s.* 6*d.* each) is that the coloured plates are omitted. The printing both as regards text and figures is admirable.

Volume I. gives an account of the form and life of plants. We have first a discussion on the nature of protoplasm, the actual living matter both of animals and plants. A description follows of the different ways in which plants take in their food—first the normal plants taking in salts dissolved in water from the soil and gases from the air, then those plants which obtain their food from dead and decaying animal and vegetable matter, and finally parasites, plants which obtain their food by growing on and robbing other living plants.

The volume ends with a description of the different forms of root, stem and leaf met with in the higher plants, showing how beautifully these various forms are adapted to the conditions under which plants live.

Volume II. is chiefly occupied with an account of the reproduction of plants. The author describes the means by which fertilization is effected in the lower as well as in the higher plants, and how the reproductive bodies—spores or seeds—are distributed to 'fresh fields and pastures new.' The chapter on the contrivances to which plants have been driven to secure the dispersal of their fruits and seeds is one of the most interesting in the book.

It is quite impossible to do justice to the merits of this fascinating book in a short notice; we recognize throughout the deep sympathetic interest the author took in plant life. It is true that the explanations given by the author as to the meaning of certain modifications of plants sometimes appear far-fetched and hardly warranted by facts, but even here he is always interesting, and the clearness with which he states the facts always gives a clear appreciation of the subject in question. The book may be confidently recommended to all interested, in any way, in plant life.

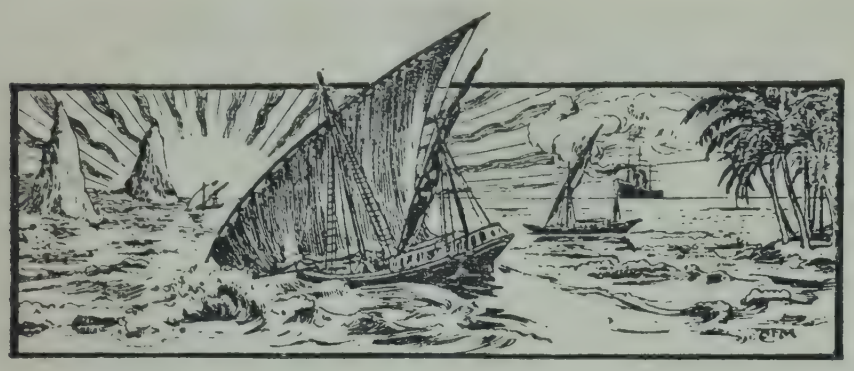
Messrs. Blackie & Son, to whom we are indebted for copies of the first two parts request us to state that they will be pleased to forward prospectuses of this or of any other of their works noticed in these columns to any one applying for them.

DEPARTMENT NEWS.

Mr. G. Whitfield Smith, the Travelling Superintendent of the Department, left Barbados on the S. S. *Maranhense* on the 2nd. instant for New York. Mr. Smith will return by the first available boat to the Virgin Islands and Montserrat, and later will visit the Botanic Stations in some of the other islands. He will also give a course of Lectures to Teachers at Montserrat.

Mr. L. Lewton-Brain, B.A., arrived from England by the mail of September 29, and assumed his duties as Mycologist and Agricultural Lecturer of the Imperial Department of Agriculture. Mr. Brain was formerly demonstrator in Botany at Cambridge University.

A 'Scavenger' Fly. Mr. Hart of the Botanic Garden, Trinidad, has sent some flies, found by a Trinidad planter on diseased bananas. The chrysalis case (puparium) of the flies showed clearly that the grub was what is known as a 'rat-tailed maggot,' that is, a maggot with a long telescopic tail which enables it to live buried in liquid or semi-liquid matter, the long tail being stretched to the surface to get air. Probably the grubs of the fly lived in the decaying matter of the bananas: it is improbable that they are in any way hurtful. They are more likely useful members of the great tribe of 'scavengers' to which we owe so much.



NEWS FROM THE ISLANDS.

The plants at the Tobago Botanic Station are reported to have made excellent growth during the year 1901-02, and the Station is assuming an attractive appearance. Preparations have been made for further planting and several experiment plots have been defined and laid out.

A gate has been placed on the southern boundary of the Botanic Station, Tobago. The new road affording direct access to the Station from the landing stage and wharf has proved a great convenience to visitors.

Mr. G. M. De Freitas at Woodlands, Grenada, has grown a specimen of a Black Antigua pine, 9 lb. in weight. Equally good results have been obtained at Dominica.

The attack of scale insects on lime trees is reported from Grenada. The scale in this instance was found to be the West Indian red scale, a common pest on citrus plants.

Carbon bisulphide is being used to preserve Indian corn from weevils in Barbados. The corn is stored in hogsheads, into each of which one to one and a half ounces of carbon bisulphide is placed, when the whole is tightly sealed. The cost per hogshead is about three to five cents, but if the chemical were more largely used, the cost should not exceed two cents.

Weather favourable to growing crops is reported from St. Lucia for the past month. The rainfall has been abundant, 12 inches being recorded for August and about 14 inches for September. There have been no very heavy and destructive showers nor high winds.

A suggestion has been made to hold a District Agricultural Show in St. Patrick's parish, Grenada, early next year.

Sweet potato meal has recently been prepared in Anguilla, by machines imported by the Imperial Department of Agriculture. Samples were forwarded by last mail to the West India Committee and to the Imperial Institute, London. Some more was placed on exhibit at the Planters' Hall, Bridgetown, Barbados.

Nature Teaching, the Agricultural text-book prepared by the Department for the use of West Indian schools, is being largely adopted in Trinidad. One hundred additional copies were ordered by last mail.

Active steps have been taken during the last few months to encourage the cultivation of English vegetables amongst the peasantry in the country districts of Dominica.

The Agricultural Instructor of Dominica reports that during his recent tours he has successfully budded sour orange stock in some of the outlying districts with the Washington Navel. It is only by such travelling instructors that methods of cultivation can be improved in many of the country districts of some parts of the West Indies.

The Laboratory and class rooms at the Agricultural School, St. Vincent, are approaching completion, and it is hoped that they will be in working order at an early date.

The St. Vincent Agricultural School was inspected by the Medical Officer on August 29. He reported : 'Inspected school and out-buildings and found everything clean and in a sanitary condition; the general health of the pupils continues to be very satisfactory.'

The local Instructor at Montserrat has been giving practical demonstrations as to the best methods of sowing onion seed, and generally helping on those taking up this cultivation.

The outlook for the onion crop of Antigua next year is promising, no less than double the previous quantity of seed having been ordered

The Smooth Cayenne pine appears well suited to the conditions prevailing at Antigua. The fruits from an experiment plot last year averaged 8¾ lb each. If anything, they were too large for the London market, where, however, they fetched remunerative prices.

A fair quantity of teak seed is available annually from the St. Vincent Botanic Station. A seedling planted out in the Garden six years ago is now 41 feet. high, with a circumference of 3 feet 6 inches at one foot from the ground, and 2 feet 6 inches at a height of 6 feet.

A fine specimen of the Pampas grass is now an object of interest at the St. Vincent Botanic Station. It carries as many as thirty plumes.

Some specimens of scale insects attacking plants have been received from St. Lucia through Mr. E. Buckmire, the Foreman of the Botanic Station. These include ten species, one new to St. Lucia (the Barnacle Wax scale).

Settlers from Grenada are arriving at Tobago and purchasing lands from estates for the cultivation of cacao. They prefer estate lands to Crown lands, owing to the former being more accessible.

A series of lectures to the school teachers of Barbados on the manner and method of teaching the principles of Agriculture by means of object lessons was organised some time back by Dr. Morris. The first of these lectures was delivered on Saturday Oct. 4, at Harrison College by Dr. Longfield Smith. The lecture was well attended, 44 teachers being present.

The subject dealt with by the lecturer was 'The air we breathe' and the lecture was well illustrated by experiments, nearly all of which could be easily performed by any teacher with a few glass tumblers, some saucers, a pail, and other simple articles. At the close of the lecture cyclostyle notes containing a summary of the lecture and a list of experiments were given to each teacher.

ANTIGUA: REPORT ON ECONOMIC EXPERIMENTS. Conducted in Connexion with the Botanic Station, By the Hon'ble Francis Watts, B.Sc., and Mr. W. N. Sands.

The experiments described in this report have as their objects the improvement of local food products, the introduction of new crops, and the placing on record of facts of interest with regard to insect and fungoid attacks, and climatic conditions.

In the experiments with green dressings the Velvet bean was found so subject to insect attacks as to be of little value to the island. The most promising plants for this purpose, so far, appear to be the White Bonavist, (called the Louisiana Cow-pea in Antigua,) and the Montpellier bean.

An interesting series of experiments are in hand with the object of raising varieties of Indian corn, combining the disease-resisting powers of the native corn with the larger grain and heavier yield of the imported varieties.

Cotton, oil plants, sweet potatos, yams, etc., have all received attention.

The second portion of the Report is devoted to 'minor industries.' The experiments with onions have been continued successfully, and the cultivation of pine-apples, other than the Black Antigua variety, tried with satisfactory results. The experiments with tobacco indicate that a tobacco, admirably suited to the requirements of the peasant class, can be produced locally.

Agricultural Shows in British Guiana.

The recently formed Board of Agriculture in British Guiana, according to the *Demerara Chronicle* has lately dealt with the question of the manner in which the government grant for Agricultural Shows should be expended. For some years past horticultural exhibitions have been held in Georgetown under the auspices of the Royal Agricultural and Commercial Society. For various reasons however, this body has found it impossible to deal adequately with the vast number of exhibits sent in and it has been decided to hand over the direction of Agricultural Shows to the Board of Agriculture which is now the recognized authority for the disbursement of Government grants in aid of Agriculture.

In order to render the Agricultural Shows of the Colony of real use in agricultural development, the Board has decided that future exhibitions must be agricultural rather than horticultural in character, and only exhibits of field and garden produce of economic importance and live stock will in future be accepted. The value of this decision cannot be too greatly emphasised. To offer prizes for every kind of experimental produce, before it has been proved to be of commercial importance, is to place new and imperfectly tested products on a level with those which long and careful trial has proved of value to the Colony. Such a procedure would only encourage hasty experimentation and premature conclusions which would undoubtedly do much harm to new industries. It is in every way desirable that Agricultural Shows should limit their awards to produce of economic importance.

THE 'AGRICULTURAL NEWS.'

The following are a few of the comments received in connexion with the *Agricultural News*:—

MR. C. P. LUCAS, *Under Secretary of State for the Colonies*

Mr. Chamberlain regards with interest and satisfaction the efforts that are being made, through the agency of this publication, to disseminate agricultural information suited to the circumstances of the West Indies, and he desires me to convey to you his congratulations upon the publication of the first number.

Nature.

Its contents are of a most varied character, appealing to all classes of cultivators in the islands, dealing not only with the staple industry, sugar, but also with bats, beetles, tarpon fishing, grape cultivation, market reports, notices of books, etc.

Journal of the Royal Colonial Institute.

Dr. Morris, who has already done so much in this direction, is to be congratulated on the general appearance and selection of subjects in the first issue of the *Agricultural News*.

Gardeners' Chronicle.

The *Agricultural News*, the newly-established Review of the Imperial Department of Agriculture for the West Indies, always good, improves as it goes on. It supplies to the planter just the kind of information he requires, and emphasises the need of brain-culture as a preliminary to practical work.

The Jamaica Educational Bulletin.

A valuable instrument in the uplifting of the West Indies—uplifting the several Colonies into the view of one another and into the view of the Mother Country and her markets and capitalists.

The Times of St. Vincent.

We have much pleasure in recommending this new publication to our peasant proprietors and other persons interested in agriculture.

Barbados Agricultural Reporter.

We have no hesitation in declaring that a really first-rate publication has been launched. That the journal is calculated to prove of abundant service in the cause of agricultural education is beyond doubt.

The Dominican Guardian.

One of its interesting features is the information touching the condition of the markets, both in London, New York, Barbados and other Colonies . . . We wish it a long and useful career.

The Montserrat Herald.

The *Agricultural News* contains several bits of useful and instructive readings for all classes of agriculturists. That it may have a wide circulation in the island we heartily commend it to our readers.

Colonial Secretary of Antigua.

The publication is likely to be a most useful one and shows the earnest desire of the Officers of the Imperial Department of Agriculture to promote the agricultural interests of the Colony.

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—Sept. 16, 1902.—Messrs. Gillespie Bros. & Co. and 'The Public Ledger,' Sept. 13, 1902.

Aloes—Curaçoa, 10/- to 32/-; Barbados 13/- to 35/- per cwt.
Arrowroot—St. Vincent, 3*d* to 5*d* per lb.
Balata—Venezuelan, 1/10 to 2/5½ per lb.
Bees-wax—Jamaica, £7 5*s*. to £7 12*s*. 6*d*. per cwt.
Cacao—T'dad, 60/- to 85/- ₱ cwt.
Dominica 56/- to 57/- per cwt.
Grenada, good 56/6 to 63/- per cwt.
Jamaica, 55/- to 63/6- per cwt.
Cardamoms—Mysore, 1/- to 3/- per lb.
Cassia Fistula—5/6 to 35/- per cwt.
Castor Oil—3½*d* to 4¾*d* per lb.
Coffee—Jamaica, 37/- to 125/-; Peaberry 75/- to 115/- per cwt.
Costa Rica, 42/- to 99/- per cwt.
Trinidad, 26/6 per cwt.
Cotton—4¾ to 5¼*d*. per lb.
Cowage—1*d* to 2*d* per lb.
Fustic—3/10 to 4/5.
Ginger—Jamaica, 36/- to 55/- per cwt.
Honey—fair amber 14/- to 21/- per cwt.
Isinglass—West Indian, 1/- to 3/- per lb.
Jalap—4*d* to 6*d* per lb.
Khus-Khus Root—12/- per cwt.
Kola Nuts—1*d* to 4*d* per lb.
Lime Juice—Raw, 1/- to 1/1 per gallon; concentrated, £12 10*s*. per pipe.
Logwood—Jamaica, £4 2*s* 6*d*. to £4 7*s*. 6*d*.
Mace—1/3 to 2/10 per ℔.
Nitrate of Soda—Agricultural £8 15*s*. per ton.
Nutmegs—80*s* @ 1/5, 60*s* @ 2/7, per ℔.; in shell 4*d* to 5*d*. per lb.
Oil of Limes—Distilled 1/8; Hand pressed 4/- per lb.
Pimento—fair to good 2⅞*d* to 3*d*. per lb.
Sarsaparilla—Jamaica, 8*d*. to 1/3 per lb.
Sugar—Barbados Muscovado, 12/- to 13/- duty paid; Trinidad and Demerara crystallized 12/- to 14/9 per cwt.
Sulphate of Ammonia—Grey, 24 per cent., London £12 5*s*. per ton.
Tamarinds—Barbados 12/- to 15/6; other West India 5/- to 12/-. per cwt.
Tonquin Beans—9*d*. to 2/6*d*. per lb.
Fruit—Covent Garden Market ('Gardeners' Chronicle,' September 11, 1902.)
Bananas—5/- to 8/- per bunch.
Lemons—12/6 to 25/- per case.
Oranges—no quotation.
Pines—3/- to 5/6 each.

Halifax N. S.—'The Maritime Merchant', Aug. 14, 1902.

Molasses—Porto Rico 30c. to 33c., Barbados 24c. to 25c. per gallon.

New York,—Sept. 19, 1902.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaicas, 90c. to 95c. for firsts, 8 hand bunches 70c. to 75c.
Cacao—African, 13¼c. to 13⅝; Caracas, 13¾c. to 14¼c.; Jamaica, 11c. to 12¾c.
Grenada, 13c. to 13½c.; Trinidad 13c. to 14½c. per lb.
Cocoa-nuts; Small Trinidads $12.00 to $13.00; Jamaicas $23.00 to $25.00 per M.
Coffee—Rio, good ordinary 5⅝c.; Jamaica 6c. to 7c. per lb.; Manchester grades 8½c. to 11c. per lb.
Ginger—8½c. per lb.
Pimento—4¾ to 5c. per lb.
Rubber—Nicaragua Scrap 52c. to 53 per lb; sheet 48c. to 50c. per lb.; Guayaquil Strip 50c. to 52c. per lb.
Sugar—Muscovado, 89°, 3c.; Centrifugals, 96°, 3½c. per lb. molasses, 89°, 2¾.

INTER-COLONIAL MARKETS.

Antigua,—September 24, 1902.—Messrs. G. W. Bennett, Bryson & Co., Ltd.

Molasses—10c. per imperial gallon, package included.
Sugar—Muscovado $1.25 per 100lb.

Barbados,—Sep. 27, 1902.—Messrs. T.S. Garraway & Co.

Arrowroot—good quality, $3.50 per 100 lb.
Cacao—$13.50 per 100 lb. Dominica $14.00.
Coffee—Jamaica and ordinary Rio $8.00 to $9.00 per 100 lb. respectively.
Hay—New Brunswick 90c. to $1.00 per 100 lb.
Manures—Nitrate of Soda $65.00 per ton; Ohlendorff's Dissolved Guano; $60.00; Sulphate of Ammonia $75.00 Sulphate of Potash $70 per ton.
Molasses—No quotations.
Onions—Madeira $1.80 to $2.11 per 100 lb.
Potatos—$3.40 per 160 lb.
Rice—Ballam $4.60 per bag; Patna 3.50 to $3.75 per bag; Rangoon $3.00 per bag.
Shallots—No quotations.
Sugar—No quotations.

British Guiana,—Sept. 25, 1902.—Messrs. Weiting & Richter.

Arrowroot—$10.00 to $12.00 per barrel.
Cacao—native 11c. to 13c. nominal per lb.
Cassava Starch—$8.00 per barrel.
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica 11c. per lb. (retail.) Creole, 11c. to 12c. per lb.
Eddoes—$1.44 per bag.
Onions—3c. to 3½c. per lb.
Pea Nuts—Curaçoa 3¾c.; American 5c. (retail) per lb.
Plantains—20c. to 32c. per bunch.
Potatos English—$4.25 per barrel, declining.
Rice—Ballam $4.75 to $4.80; Patna $5.90, Seeta $5.90 per bag.—Creole Rice 20c. per gallon, (retail.)
Sweet Potatos—Barbados, none, Creole $1.44
Tannias—$1.80 per bag.
Yams—$2.88 per bag.
Molasses—Vacuum Pan, first yellow, no stock, no sales; nominal value 14c. to 15c. per gallon, casks included.
Sugar—Dark Crystals $1.67½ to $1.70⅛; yellow $2.10 to $2.20 per 100 lb.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—September 24, 1902.—Messrs. Gordon Grant & Co., and September 26, 1902.—Messrs. Edgar Tripp & Co.

Cacao—Ordinary to good red $12.75 to $13.00; estates, $13.50 per Fanega. Venezuelan $13.00 to $13.70 per bag.
Balata—Venezuelan 42¾c. to 43¼c. per lb.
Coffee—Venezuelan. 7c. per lb.
Onions—$2.25 to $3.00 per 100 lb.
Potatos English—$1.12 to $1.35 per 100lb.
Rice—Yellow $4.55 to $4.75; White Table $5.25 to $5.75 per bag.
Sugar—For Grocery use, $1.60 to $3.00 per 100lb.
Molasses—No quotation.

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May 22, 1902.

H. J. INNISS,
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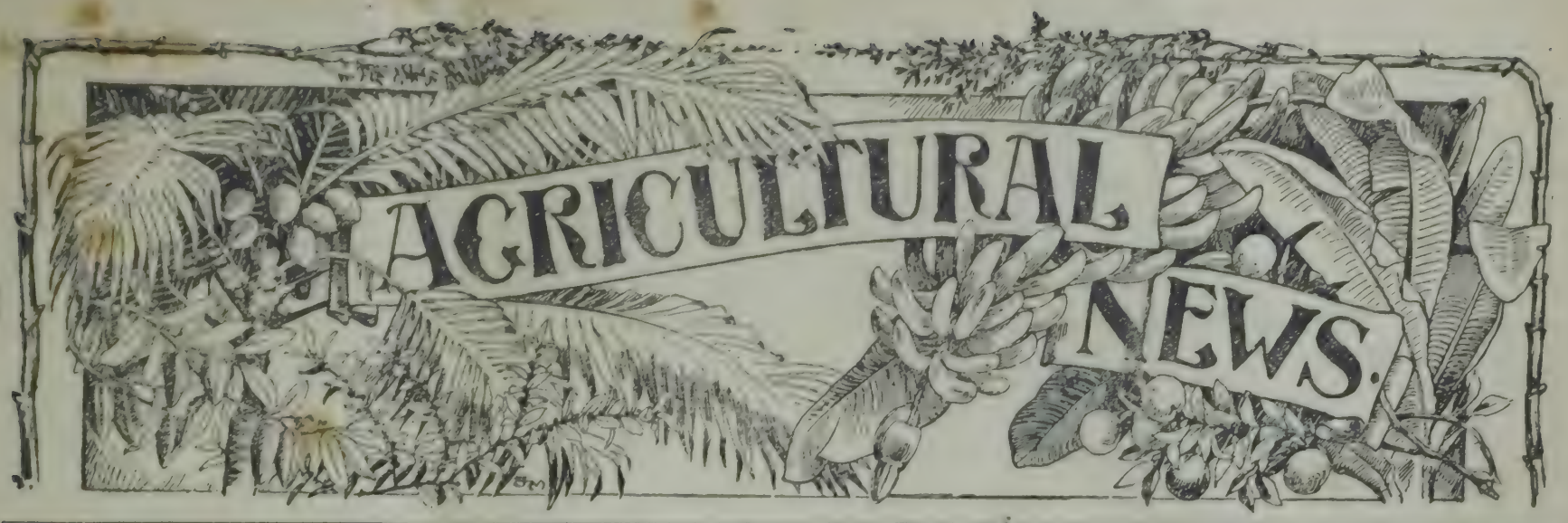

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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The Demand for Cotton.

TO the 'Year-book' of the United States Department of Agriculture for 1901, Mr. J. L. Watkins, the Cotton Expert of the Department, contributes a paper entitled 'The Future Demand for American Cotton.' This paper is of particular interest to the West Indies at the present time, containing, as it does, an account of the extraordinarily rapid growth of the world's demand for cotton during the last hundred years, together with some forecasts as to the future.

The three most important textile fibres of the world are flax, wool and cotton. At the end of the eighteenth century (1793) wool occupied the first place in Great Britain, flax being second, and cotton third. 'In fact the value of cotton fabrics and yarns amounted to only 5 per cent of the whole.' Ten years later cotton had advanced to second place, and in another ten years had attained the lead. This position it still occupies, with its two competitors left far behind. The following figures from Elison's *Cotton Trade of Great Britain* well illustrate this point. The consumption of cotton, wool and flax in Great Britain is given in millions of pounds.

Years	*Cotton*	*Wool*	*Flax*
1799-1801	41·8	100·6	108·6
1898-1900	1,594·0	496·6	214·7

These figures show that during the last century, whilst the increase of consumption of flax increased about twice, that of wool increased by five times and that of cotton by no less than thirty-nine times.

The enormous increase in the amount of cotton used has been due to various causes. In the first place, new markets have been found for cotton goods, and many races who formerly went unclothed now wear cotton fabrics. In other countries cotton has entered into competition with linen, wool and silk. An interesting example of the competition between cotton and

linen is given in the 'Decline and Fall of the Linen Shirt' a recent editorial in the *Irish Textile Journal*. 'According to this authority the Rothschilds used to order, on occasions, a supply at a price up to thirty shillings a shirt whereas those now required for the Duke of York and other Royalties are turned out at Belfast with only fronts and cuffs of linen, the bodies of cotton.' Similarly cotton has become a formidable competitor of wool, and even of silk and 'mercerised cottons' now displace silk to a certain extent in various classes of goods.

The world's total consumption of cotton has increased threefold during the last fifty years. In 1860 about 4,500,000 of bales of cotton (of 500lb. each) entered the markets, whilst in 1901 the 'commercial crop' was 12,500,000 bales. Of this total no less than 85 per cent. is supplied by the United States.

With regard to the future demand for cotton Mr. Watkins states: 'It is estimated that of the world's population of 1,500,000,000 about 500,000,000 regularly wear clothes, about 750,000,000 are partially clothed, and 250,000,000 habitually go almost naked, and that to clothe the entire population of the world would require 42,000,000 bales of 500lb. each. It therefore seems more than likely that the cotton industry will go on expanding until the whole of the inhabitants of the world are clothed with the products of its looms. This is not an unreasonable conclusion when we consider the fact that cotton is the cheapest material for clothing known to man. In the meantime it may come to pass that the world's area suitable for cotton culture may have to be seriously reckoned with.'

It is improbable therefore that the supply of cotton in the world is likely soon to exceed the demand, and although the West Indies can never hope to regain their old position and contribute 71 per cent. of the cotton used in Great Britain, as they did in 1793, there seems no reason why they should not once again produce cotton to a sufficient extent to be a very considerable source of wealth to these Colonies.

The Snakes of Barbados.

Mr. C. T. Murphy of Turner's Hall Wood school, Barbados, writes:—'With regard to the snakes of Barbados, the only place where the larger species may still possibly exist, is along the windward coast of St. Andrew. I last saw one about five years ago, about a yard in length, and of a grey colour. Before the introduction of the mungoose they were frequently found under cow-pens, but now they seem entirely extinct in the interior. The Guana lizard also seems to have been driven to this part of the parish as a last resort by the mungoose. It is rarely now that one is seen.

SUGAR INDUSTRY.

Beet Sugar in United States.

COST OF PRODUCTION.

The most important general survey of the condition of the sugar industry as at present carried on in various parts of the world is undoubtedly that of Dr. H. W. Wiley of the United States Department of Agriculture, delivered before the Ways and Means Committee of the House of Representatives at Washington. From the account published in the *Louisiana Planter* we extract the following summary of the cost of beet sugar production in the United States. By allowing for the charges for duty and freight West Indian planters may calculate the price at which they must produce cane sugar in order to compete on even terms with beet sugar in the United States' markets. Dr. Wiley said:—

'With all the reliable data which are available, I would say:

(1) The average yield per acre of beets in the States does not reach ten tons.

(2) Our farmers, for the most part, are growing beets without any fertilization and it is not likely that the average will be increased until fertilizers are abundantly supplied and more scientific forms of agriculture practised.

(3) It is almost impossible to determine just what the farmer's expense in growing a crop of beets is, as it is hard to estimate his labour and that of his own people and farm animals.

The actual cost of the production of beets in this country, where fertilizers are not used, may be confidently stated as not less than $30·00 per acre.

'The cost of manufacturing the beets is better known, because the data are more easily accessible. In the manufacture, in the census bulletin, there were used the following quantities of materials:—

Limestone, 64,805 tons.
Coke, 7,519 tons.
Sulphur, 149 tons.
Barrels, 90,985.
Sacks, 1,342,649.
Coal, 109,235 tons.
Oil, 7,017,079 gallons.
Wood, 3,459 cords.

'In the manufacture of these beets the following expenses were incurred:

	$
Paid for beets	3,485,320
For fuel	453,036
Milling supplies	18,933
Freights	369,070
All other materials	477,437
Salaries and wages	1,448,882
Miscellaneous expenses	451,351
Total	$6,704,029

'The above represents the actual expenses of manufacturing 794,658 tons of beets, yielding products which are valued at $7,323,857. This shows an apparent profit on manufacture of $619,828 on an invested capital of $20,958,519 which represents almost exactly 3 per cent. of money invested. No account has been taken, however, of the deterioration of the plants, known as wear and tear repairs. This on a capital of $20,000,000 would be at least 10 per cent., or $2,000,000. If this be taken into consideration, the apparent profit of 3 per cent. on the manufacture vanishes.

'Now, while it is doubtless true that a few of the factories during the census year made profits, it is perfectly evident, from a critical study of the only reliable data which we have on the subject that for the whole sum invested, after allowing for wear and tear, there was a deficit instead of a profit. We readily grant that the census year, viz, the year ended May 31, 1900 was not a most favourable one, from an agricultural point of view. In fact, if this assumption is not made it is evident that the beet sugar industry of the United States is not on a paying basis. But granting this point, it is clearly seen that, taken as a whole, the profits made by the farmer in growing the beets are not greater than the character of his labour and the expenses connected therewith would warrant.

'The above data show that the total number of pounds of beet sugar made was 161,474,100 which would make the actual cost of sugar 4·15 cents per pound. It may be safely stated, therefore, that the minimum cost of the production of beet sugar in the United States, up to the present time, has not been less than 4 cents per pound.

'The cost of making beet sugar is slightly greater than that of cane sugar, and this is easily explained when it is considered that the process of manufacture of beet sugar is more complicated by far and more expensive than that required for cane sugar.

'The actual price paid for foreign sugars delivered in New York is easily obtained by deducting from the market price the amount of duty which is collected. To the amount of duty must be added the countervailing duties on sugars imported from Germany, Austria, Russia and France, and other countries paying bounties on exported sugars.'

GOAT KEEPING.

In parts of the West Indies goats are carefully attended to and reared by the peasantry chiefly with the object of selling their young for 'mutton.' Strangely enough, goat keeping with a view to milk production does not appear to be largely taken up. The goat is to the poor man what the cow is to his richer neighbour, and there are doubtless many families without the accommodation for a cow or lacking the means of keeping one, who could keep a couple of goats deriving similar advantages as from a cow, though to a lesser degree.

The question of goat keeping *versus* cow keeping is interestingly discussed in *The Country* for July, 1902, and some practical points are brought out which should be of interest to the peasantry in many of the West Indian islands:—

The goat, like the pig, is an animal which, if properly managed, should get its living in great part from vegetables and house-scraps which would otherwise be wasted. For instance, the peelings of potatos, yams, etc., the trimmings of fruit trees and shrubs, the mowings of a lawn and the leaves of trees, which are consigned to the manure heap would go a long way to feed one or more goats. The goat is most scrupulous as regards the cleanliness of its food, and therefore potato prunings and such things should be washed free from dirt, and lawn mowings should not be trampled upon before being served. The great point in feeding these animals consists in giving small quantities only at a time, and often. Salt should be given occasionally. Another rule to be observed in feeding is never to place fresh corn or fodder in the feeding box or trough without clearing out any remains of the previous meal.

A good milch goat should have a nice, soft, thin-skinned udder and pliable teats, of sufficient length and substance to be easily and comfortably grasped by the hand. The work of milking is greatly facilitated by letting the goat jump on to a bench about two feet high. As a rule goats should be milked twice a day. Perfectly clean utensils should be used, and they should be scalded out with boiling water, and then rinsed in cold water before being left to dry. Goat's milk is superior to cow's milk, in that it is not only more digestible and nourishing and therefore specially adapted to feeding infants and invalids, but it is far richer when used on the table. Another important point in connexion with it is, that the goat is considered to be practically immune from tuberculosis and therefore the milk may be freely used by infants without any fear of bacilli being introduced into the blood.

INSECTS AT SEA.

During a sea voyage insects are perhaps the last thing one would expect to find, save perhaps those cockroaches, ants, etc., that are so often a plague on board ship.

Interesting records are occasionally made by travellers, of insects met with far out to sea, that could not have come with or on the ships, and these records are always of value as indicating how insects spread from place to place.

During a recent voyage of the S. S. *Talisman*, from New York to Guadeloupe, a large green and black pond-fly was seen to fly up to the ship from the port quarter, and it remained hawking around the stern for some time before it flew off.

The ship was, according to Captain Hansen, 200 miles west of Bermuda, and the insect would appear to have come either from Bermuda or from the more distant coast of the United States. It might possibly have subsisted during that time on the well-known sea insect, *Halobates*, which lives on the surface of tropical seas and has been found in West Indian waters. It is also possible that it had remained unseen on or near the ship during the five days' journey from New York, but the latter supposition appeared unlikely.

WEST INDIAN FRUIT.

VANILLA CULTIVATION.

The following are the remainder of Mr. Galbraith's miscellaneous notes on Vanilla cultivation in the Seychelles, and are in continuation of those given on page 197:—

SUN CURING.

During early crop gathering, before ripe pods are numerous enough to make it worth while using the hot room they are cured under blankets in the sun, but have to be taken in at the hottest part of the day if sunshine is continuous. This used to be the sole method of curing here and when used now gives excellent results in favourable weather; but dependence upon the sun is risky, and upon the whole the process is cumbersome and costly. Hand trays that can be piled up on top of each other and carried between two men, are used to spread the blankets on, a fold being below as well as above the pods, and these are supported on low double rails to keep them clear of the ground. In unsettled weather showers have to be watched for, and the trays carried under shelter till the weather again becomes fair.

If there is a pinch for space in the curing house, pods in the hot room may be spread two or three or more deep on the shelves and tumbled up daily, that is, such of them as are not taken off and re-sorted.

MULCHING AND SHADE.

In mulching vanilla roots, and especially at crop time, the plants are much more benefited if the mulch be of two sorts, well-rotted leaf mould being put on first for immediate action, and above it a layer of withered fern or the like, which decays more slowly. When heavy top dressings of quick-decaying manure, grass, etc., have rotted down, they get beaten away by rain, the net-work of roots becomes exposed, and may with advantage be lightly covered with a thin sprinkling of good soil. Obviously it is better to apply this before the roots become bare or visible. The vanilla roots delight in twisting among stones, large and small, and flattening against their lower surface when not embedded in the soil. When these are of a convenient size and handy in a plantation, the root circuit allowed to each vine may be ringed with them. Vanilla may be grown on trees of thick foliage if there are of a sort that will stand being well pruned annually. Wild cinnamon, which gives dense shade, is sometimes used for this purpose, the branches being nearly all cut off each year about pod-ripening time, which also lets the sun get at the vines for flowering. The contrast between the former somewhat dense shade, which has grown since last branch trimming, and the strong light let in by the pruning seems to help toward blossoming.

Under large, high trees, wide apart, where to plant vines on other small-growing wood between them would make the shade too close, vanilla may be fixed on tripods of durable wood, the three stakes being tied with wire crosswise some little way from their top ends, so as to furnish forks over which the vine creepers may climb. High up in the hills here the plants may be grown in this way without any shade at all, but the plan is only suitable for level grounds or moderate slopes.

SUMMARY.

The foregoing account of vanilla cultivation, being the outcome of experience gained in the Seychelles alone, and there chiefly in the hills, may need many modifications to adapt it to different circumstances pretaining to other lands, and, indeed, possibly may be of little use for such. For instance, in a drier climate irrigation might be needful, and it would not be necessary with a reliable, sufficient annual dry period to prepare vines for flowering by checking their sap flow in certain branches, as it is in this colony. This is not found necessary in certain districts where the rainfall is not such as to keep plants growing continuously, for they stop growing of themselves and come into flower without coaxing.

Again, under less favourable growing conditions the vines would need more nutriment and attention to stimulate growth.

These and similar considerations which will suggest themselves to the reader may serve to save a brief summary from appearing too dogmatic.

The following conditions of climate, method of growing, etc., appear to the writer to be most favourable to the successful cultivation and handling of the vanilla crop.

Climate.—With shade temperature ranging about 80° F., never much above or below it, and a humid, still atmosphere; a rainfall of 80 to 100 inches or more, evenly distributed through ten months in the year, the remaining two months being dry, with occasional short and very light showers—the ten wet months for continuous luxuriant growth, the two dry ones to check it and bring vines into flower.

Soil.—A skin of rich vegetable mould resting on a porous substratum. Failing that, with the above climate, vanilla should do well on any soil if the roots are kept covered with decaying vegetation.

Situation.—Moderate slopes.

Shades.—Small-leafed trees to let checkered sunlight through.

Plants.—Cuttings 10 to 12 feet long of growing shoots, which should not cease growing if planted after the dry season, but go strait on and flower fully in two years.

Planting.—Either in line on posts and bars, or on shrubs of suitable size and leafage, at the risk of wholesale destruction from disease; or plants well kept apart, each on its own support, so that any vine showing signs of sickness may be removed before infecting its neighbours.

Culture.—Plantations to be gone through bi-monthly; shoots on the ground looped up; climbing branches brought down; decayed leaves, etc., laid on roots for manure, when needed. Preparations for flowering according to climate.

Cropping.—Flowers to be pollinated in forenoon, preferably such as will hang clear and grow straight pods, quantity regulated according to mass and vigour of each vine, but not such as to hinder the start of new growth for more than two or three months. Pods should be gathered every other day.

Curing.—The slower, the better, beginning in a heated room at about 113° F. for some days, then in a cooler one, 90° to 100° F., finishing at ordinary temperature; humidity of air kept down if need be by charcoal braizers.

Marketing.—Qualities and lengths kept distinct, made up in packets of 50 pods, and neatly packed in tins holding about 12 pounds each.

Labour.—Cheapness and intelligence are of the greatest importance in vanilla production. The cultivator must himself have his eyes everywhere; the best of labour known here deteriorates quickly if left by ifself.

A DISEASE OF PINE-APPLES.

Specimens of young pine-apple plants attacked by a 'wilt' disease or 'blight,' have been received by the Department. The younger stages of the disease were marked by the tips of the leaves turning yellow and drying up; in the older stages the discoloration of the leaves had proceeded further and they were more withered. These symptoms pointed to an insufficient supply of water and hence probably to a root disease.

On washing the roots they were at once seen to be unhealthy, and in many cases were black and quite rotten. On examining a section of such a root microscopically it was seen to possess a covering of root-hairs. This is very extraordinary in old roots, as root-hairs are usually restricted to a short region of the root immediately behind the growing point. These root-hairs were in many cases filled with the attacking fungus, which was also found in the tissues of the root. Sections were also made of young, apparently healthy, roots; here also the root-hairs showed the presence of the fine, colourless threads of the fungus. It would seem probable that the extraordinary development of root-hairs mentioned above is a special effort on the part of the plant to try to replace those destroyed by the fungus.

The remedies suggested were:—

(1) To dig up and burn all diseased plants and those in their immediate neighbourhood.

(2) To lime thoroughly the soil from which these plants were taken so as to kill any of the fungus or spores that might be present.

In the case of valuable pine-apple plants, it might be found possible to save those affected by taking them up, cutting off the lower part of the stem until no more black or dark root ends are visible; then stripping off the leaves as for setting and resetting in another field. The soil from which the diseased plants are taken should not be used for some time.

EXPERIMENTS IN ONION GROWING AT DOMINICA.

We learn from the Report on the Experiment Plots at the Agricultural School, Dominica, for the year 1901-02, just issued, that two experiments were made with onions, in one case grown from seed, and in the other from sets.

EXPERIMENT WITH SEED.

The seed arrived on September 13, and sowing was begun at once and carried on at intervals of a week for a period of six weeks. The first sowings came up well, but it was observed with later sowings that the longer the seeds were kept the worse they germinated, and in some instances scarcely any grew. The seedlings were planted out on October 28 in beds, in rows 6 to 8 inches apart and 5 inches between the plants in the rows. They grew well and were fit to reap in January.

EXPERIMENT WITH SETS.

The sets arrived in good condition on October 22 and were planted out at once, in beds, in rows 6 inches apart and 3 to 4 inches between the sets in the rows. One plot was planted on fairly heavy loam, the other on light, sandy soil. The sets on the heavy soils sprouted better, grew more evenly, and were fit to reap almost three weeks earlier than those on the light soil. The yield from the heavy soil was double that from the light soil.

Both crops were ready to reap at the end of January. They were reaped as soon as the tops began to wither, and spread out in the drying house until they had dried up entirely. The tops were then cut off 2 inches from the bulb, the roots pulled off, and the onions packed into crates (made of old packing cases by the boys) similar to those used at Bermuda, and shipped to New York. Messrs. Wessels & Co., reported they arrived in good order, were of the proper size, properly packed, and as good as any from Bermuda or Cuba. They realized $2.50 per crate for the first shipment, and $2.25 for the second.

The seedlings gave a larger and more even crop than the sets, but the latter were found easier to grow and are not expensive when they sprout well. This is believed to be the first plot of onions grown in Dominica from Teneriffe seed.

Lecture to Teachers at Barbados.

The first of the lectures to the elementary school teachers of Barbados at the St. Peter's centre, on the manner and method of teaching the principles of agriculture by means of object lessons, was delivered by Dr. Longfield Smith, on Saturday, October 18. By the kindness of the Rev. G. E. Elliot, the lecture was held in the Speightstown parish room. Sixteen teachers attended besides several planters and some ladies and gentlemen of the parish interested in the subject.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the **Commissioner, Imperial Department of Agriculture, Barbados.**

It is particularly requested that no letters be addressed to any member of the staff by name. Such a course may entail delay.

Communications should always be written on one side of the paper only. It should be understood that no contributions or specimens will, in any case, be returned.

All application for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 223 of this number.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News

Vol. I. SATURDAY, OCTOBER 25, 1902. No. 14.

NOTES AND COMMENTS.

Improvement of Cacao by Selection.

'A striking feature of cacao cultivation, in dealing with fields containing different varieties is that certain kinds of cacao usually bear well, while other trees exist which year after year bear little or nothing. This shows the importance of selecting pods for seed, only from prolific strains. This has been done largely in Dominica for the past nine years. All the plants and pods are carefully selected, and in quality and bearing powers Dominica cacao should show a great improvement in the future.'

These remarks, by Mr. J. Jones, Curator of the Botanic Station, Dominica, are the outcome of several years attention to this question, and are worth the careful notice of cacao planters in the West Indies.

Molasses as Stock Food.

We have from time to time, pointed out in these columns the value of molasses for feeding stock (see pp. 66, 108, 124). Some West Indian planters and others have substituted molasses for corn or oats with entirely satisfactory results. In America the planters would appear to be slow to take advantage of the good, cheap food to hand, but persist, as the majority do in the West Indies, in exporting their molasses at a low rate and buying in exchange dear corn and oats. In discussing the question the *Louisiana Planter* says:—'The sugar world, at least the United States part of it, is slow to appreciate the great value of molasses for stock feeding. While it has been definitely and frequently stated in Louisiana that a pound of molasses has about as much value for stock feeding as a pound of oats or of corn, still our sugar planters will persist in selling their molasses and buying oats and corn from the western states.'

Manuring Oranges amongst Bananas.

Recent experiments at the Dominica Botanic Station, touching the application of manures to orange trees, indicate that where bananas are growing intermixed with orange plants, the application of special manures to the latter is useless. The banana being a fast, gross feeder deprives a slow-growing plant like the orange of much of the plant food intended for it.

Housing Poultry.

The plan suggested by Mr. Barclay on page 218 of this number for keeping poultry in a comparatively small enclosed space and yet securing them a succession of fresh runs is worth consideration, especially by poultry keepers in towns. For further notes on the same subject see page 42.

Nature Study.

Reference was made in a previous number of this journal (p. 55) to the Nature Study Exhibition proposed to be held in Royal Botanic Gardens in London. *The Times* declares that this was a visible and practical answer to complaints that much of the education in rural schools in England (as we have found it in the West Indies) is unsuited to the circumstances and surroundings of the children by reason of its bookish and impractical character, and that it fails to stimulate intelligent interest in the facts of nature and the conditions of agricultural life. Some of these complaints, it is stated, are founded, or have in the past been founded, on fact and observation, others on prejudice. In any case there has been, it is claimed, sufficient grounds for the imputation against the education usually given in country schools to justify a new departure by which the training of children in rural districts may be brought into closer relation with rural life and occupations. 'The education of the country child', it is claimed, 'should be as the philosophers say, in harmony with his environment, and one obvious means to this end is the encouragment of intelligent interest in the facts of nature around him, in the formation and character of the soil, the methods of agriculture and horticulture, the life of plants, animals and all living things with which he comes in contact; last but not least, the formation of habits of observation.' This, *The Times* understands, is the object of the 'Nature Study' movement in education; to revive and if possible systematize the cultivation of interest in nature and natural objects, which there is reason to think has been somewhat crowded out or neglected by the presence of a too literary curriculum.

Onion growing at Dominica.

The interesting experiments on this subject, described on page 213 of this number, afford additional proof of the possibility of growing onions of thoroughly good quality in many of the West Indian islands.

Volcanic Dust at Barbados.

Barbados, and St. Lucia have experienced a further fall of volcanic dust due to the last eruption of the Soufrière on the 15th. and 16th. instant. Full details are not yet to hand from St. Vincent and St. Lucia. We give on page 217 of this issue some data obtained at Barbados. The total fall would appear to be, approximately, one fourth of that of May 7 to 8, varying in places from about one-twentieth of an inch to half this amount or even less. The dust of this shower is possibly of higher fertilizing value than the May dust, but on this point it is impossible to make any definite statement until the chemical analysis, now in hand, has been completed.

Insects and Volcanic Dust.

Advantage was taken of the fall of volcanic dust at Barbados on October 16, to determine what effect was produced on the insect pests and other insects in the field. Generally speaking the dust had little killing effect on the insects, most of which hid themselves during the actual fall of dust, but were yet exposed to it on the following day when the wind blew it about. From observations made on the following day, the greater number of insects escaped unharmed. Two-winged flies suffered severely, there being a notable absence of them after the dust and this applies also to the 'cow-bees,' 'wild-bees' and other Hymenoptera. It is believed also that pond-flies suffered but this is uncertain. Other groups escaped practically unharmed and there is no doubt that the dust has had little, if any, effect on the insect pests of Barbados.

The destruction of two-winged flies and of the cow-bees etc., cannot be regarded as beneficial, as many of these serve to keep caterpillars and other pests in check. Whether the great abundance of insect pests during the past months can be attributed to the 'May dust' is uncertain, but there is this evidence of the destruction of their enemies and the balance of nature may have been disturbed in this way by the fall of May dust.

It is an old belief that dust, such as ashes, plaster, etc., is a valuable insecticide, simply because the fine powder is believed to choke the insects. These observations would seem to show that dust, in itself, does little beyond killing a portion of the insect life, including the most useful part. The only crop that is likely to benefit at the present time is the corn, as the dust lodges in the hearts of the young plants and prevents the worms eating into the young leaves. In all other respects the dust may be regarded as having no beneficial effect but possibly a harmful one.

Fruiting of the Mangosteen in the West Indies.

A plant of the Mangosteen (*Garcinia Mangostana*), a native of the Molucca Islands, introduced to the Botanic Station at Dominica, fruited, for the first time last year, and has again borne a few fruits this season. The mangosteen was also introduced at St. Vincent in 1890, but although planted in a favourable situation its growth has been slow and the tree has not yet fruited.

We might add that the mangosteen has also been successfully fruited by Dr. Nicholls at Dominica.

Flies as Propagators of Disease.

'An interesting address was given by Sir James Crichton Browne, the president of the Sanitary Inspectors' Association, assembled last week at Middlesbrough. Sir James referred to the *role* played by flies in the propagation of disease. Leaving aside the researches concerning the part played by the *Anopheles* in malarial infection, he confined his attention to the common house-fly. "This most fearless and audacious of all creatures" is probably the carrier of many varieties of bacterial infection. It appears that cultures of many pathogenic organisms have been obtained recently from the excreta of the common house-fly, *Musca domestica*. The *role* played by these insects in the dissemination of enteric fever in South Africa was referred to, and Sir James remarked that one of the collateral advantages of our campaign in South Africa might prove to be the opening of our eyes to the part played by flies as disease-mongers. The enormous fertility of the ordinary fly forms one of the chief obstacles to its extermination; it has been calculated that one female fly may have 25,000,000 descendants during one season., (*Nature*, August 21, 1902).

Lagos Silk Rubber in Trinidad.

Mr. Hart writes that he has been testing the value of the rubber fluids, latex, or milk of young trees of *Funtumia elastica*, Stapf. at the Experiment Station at St. Clair, and has found excellent rubber material produced by trees a little more than three years planted. The latex of *Funtumia africana*, Stapf. has also been tested, and although found to produce a certain amount of rubber material, yet it is sticky, soft, and decidedly inferior to the produce of *Funtumia elastica*. It is possible, however, that its quality may improve with the increased age of the trees, as is the case with the Central American rubber tree *(Castilloa elastica.)* Specimens of the rubber made have been sent to an expert in England for examination and report. The rubber produced by *Funtumia elastica* is solid and elastic, resembling 'Para' rubber in appearance and probably equalling it in quality.

The presence of trees of the inferior *Funtumia africana*, at the Experiment Station is of importance as a warning guide as to what should or should not be planted. The two species were recently determined at Kew from specimens grown at the Trinidad Station.

SPRAYING YOUNG CORN.

Some experiments have been carried out with the object of destroying the 'fly' and 'worm' that attack young Indian and Guinea corn plants. The results obtained so far, indicate that a simple and effective means has been found of protecting and 'establishing' the corn at very small cost. Planters in Barbados find that a crop of corn cannot easily be raised during the latter months of the year owing to the attacks of these insects, but it is believed that the damage may now be prevented and the crop easily established without any supplying.

The method consists in spraying the young plants with an emulsion of crude, native petroleum, using a small hand sprayer, made locally. The important points in the treatment are (1) the emulsion, made with crude petroleum, which is strong, can be used very dilute, and costs little; and (2) the hand-spraying machine which is very small and simple, is worked by one man, is made locally, costs little and does a large acreage in one day. The method is also independent of weather, as the oil kills at once, and a shower soon after the application will make little difference.

It is believed that this remedy is a thoroughly practical one: it has been tried on three estates, with good results, and can be confidently recommended to planters who are now sowing corn. The method is adapted only for young plants. The machines used are of small capacity and only give a spray big enough to do thoroughly a hole of corn at one stroke.

The best formula for the emulsion is still under consideration. It can be made by dissolving one ounce of powdered, crude napthalene in 2 quarts of crude petroleum and adding this to five pounds of boiling whale oil soap which should be boiled in a 'skillet' and taken off the fire just before the oil is added. The oil and soap then combine to form a semi-solid compound of which a gill should be dissolved in 4 gallons of water or the whole in 50 gallons of water. This formula is provisional and it is hoped that it may be possible to diminish the proportion of soap. The 'crude petroleum' is mined in Barbados by the West India Petroleum Company and is sold at 5 to 6 cents per gallon. Whale oil soap is obtainable in Bridgetown at 8 and 10 cents per pound and napthalene can be bought at the druggists at a little over one cent an ounce. The emulsion ready for application costs under one cent per gallon, the chief expenditure being in soap.

The spraying machines used are sold by Messrs. C. F. Harrison & Co., Bridgetown, and this firm will make them to fill any demand that may arise. It is hoped that planters now growing corn will test this remedy after communicating with this Department, as it is desirable to carry on work on a number of estates to arrive at an estimate of the cost per acre, which is apparently very small. Fuller particulars will be published later when the experiments have been concluded.

AGRICULTURAL SOCIETIES.

Dominica.

Mr. A. K. Agar, the Hon. Secretary, has contributed an account of a general meeting of the Dominica Agricultural Society held on September 27.

A committee of management, considerably larger and more representative than that for the last show, was elected for the Agricultural Show of 1903.

The Vice-President, Mr. Lockhart, read an interesting paper on cacao. The paper was mainly historical of the origin and growth of cacao cultivation in Dominica: a comparison was made of the out-put of Dominica with that of Grenada and other places. A lively discussion followed, touching on all the points brought forward in the paper, and also on the effect produced on cacao by the fall of volcanic ash. The wish was generally expressed that the paper should be printed by the Society as soon as possible.

Votes of thanks to Mr. Lockhart for his valuable lecture, and also to the Chairman, terminated the meeting.

Antigua.

The excessively dry August and September have retarded all planting operations in Antigua to such an extent that the Agricultural and Commercial Society have been compelled to abandon the idea of holding an Agricultural Show in December. Many planters have only just sown their corn, cotton, onions and vegetables and it would be practically impossible to obtain a good exhibition of produce by December. It is proposed to hold the Show in February.

'HAY GRASS' AT ANTIGUA.

In a previous issue of the *Agricultural News* (p. 104) we expressed the desire to obtain notes of interesting foreign plants, that are establishing themselves in the West Indies. Referring thereto, Mr. W. N. Sands, Curator of the Botanic Station Antigua, writes:—

Andropogon caricosus known in Antigua as 'Hay grass' is one of these and like *Andropogon pertusus* the Barbados 'Sour-grass' it constitutes a valuable fodder. It is an East Indian species which no one has been able to determine how or when it was introduced, nor do we believe it is found elsewhere in the West Indies in such quantity. It appears to have been first noticed in the north east part of the island and from there it has spread practically all over the island, in some cases it has almost taken complete possession of pastures. Stock eat it readily even after it has flowered, so that it is more valuable than *Spirobolus indicus* the common Bed-grass which is only eaten in a young state.

Mr. C. A. Barber when Superintendent of Agriculture for the Leeward Islands mentioned this grass in a paper on Antigua grasses published in the *Leeward Islands Gazette*, September 4, 1894, pp. 166-7. At that time it was apparently only found in the neighbourhood of Clare Hall, but since then, as mentioned above, it has spread to all parts of the island. It grows in all sorts of situations, which fact adds greatly to its value in a fairly dry island like Antigua.

The Hon'ble Francis Watts in his paper 'Care of Pastures in Antigua' (*West Indian Bulletin*, Vol. I, p. 413) refers to the Hay grass as having made its appearance in Antigua in some unexplained manner, and spreading steadily to the exclusion of other kinds. It does not appear to be known in other West Indian islands.

VOLCANIC DUST.

FURTHER FALL AT BARBADOS.

During the night of the 15th. to the 16th. instant the Soufrière at St. Vincent was in violent eruption, and according to the brief telegraphic report to hand, a heavy fall of stones, ashes, etc., was experienced at Georgetown and other parts of the island. News has also been received of a dust shower at Castries, St. Lucia. Doubtless fuller accounts of the course of events in these islands will be available after the receipt of to-day's mails.

At Barbados the weather during the 14th. and 15th. had been sufficiently abnormal to cause at any rate one observer to take careful note of the clouds, wind, temperature and barometric readings. The morning of Thursday the 16th. was noteworthy for the deep, slaty-blue cloud which, with a sharply defined lower edge, advanced towards the island from the south-west. To the north, the sky was blue, with a few normal cumulus clouds. These as they passed in front of the advancing dust-cloud, lost their whiteness and became of an ashy-grey colour.

The sun was distinctly visible for only a few hours in the early morning. Gradually the cloud passed in front. For some time the sun's disc was seen shining through with a curious greenish tint, but by about 10 a.m. it had practically disappeared. At intervals its position could be surmised, owing apparently to the dust-cloud being less dense in certain places.

In the south of the island dust began falling about 9 a.m. It was at first distinctly moist, and each 'drop' of dust consisted of a large number of fine particles which scattered as they fell.

We are indebted to Mr. R. Radclyffe Hall, B.A., Acting-Professor of Chemistry at Bardados, for the following particulars relative to the fall:—

'Samples were collected at the Government Laboratory in Bridgetown from 9 a.m. to 11 a.m., from 11 a.m. to 1 p.m. and from 1 p.m. to 3 p.m.: the blowing about of the dust by the breeze in the earlier hours of the morning of the 17th. prevented the last sample, collected between 3 p.m. on the 16th. and 8 a.m., on the 17th. being of any statistical value: the rate of fall was as follows:—

October 16.

From 9 a.m. to 11 a.m. at the rate of ·48 tons per acre.

From 11 a.m. to 1 p.m. at the rate of 2·10 tons per acre.

From 1 p.m to 3 p.m. at the rate of 1·34 tons per acre.

Total from 9 a.m. to 3 p.m. at the rate of 3·92 tons per acre.

I also collected two samples at 'Rosebank,' Hastings, about two miles south-east of Bridgetown where the fall was:—

From 8.45 a.m. to 4 p.m. on 16th. at the rate of 4·59 tons per acre.

From 4 p.m. on 16th. to 7 a.m. on 17th. at the rate of ·20 tons per acre.

Of this ·20 I estimate about ·13 tons per acre had fallen by 5.30 p.m. on the 16th.

'These figures suggest that the fall at Hastings was heavier than that in the neighbourhood of the Government Laboratory. I had previously formed the idea that the cloud was heavier towards its south-westerly side and it seemed to me that it was darker at Hastings than further inland and towards the city, in fact we appear to have obtained in this case rather the "tail end" of the dust storm: the coarser particles may have travelled in a more southerly direction than the previous one of May 7 and then have fallen in the sea to the south east of Barbados.

If this were so, it would account for the fall beginning so long, nearly 6 hours, after the eruption, and we should also expect to find that the fall was heavier on the south easterly side of the island.'

Mr. Hall adds:—

'The noise caused by the eruption was sufficiently marked to wake me at about 2.30 on the morning of the 16th. and while trying to locate the cause of my awakening I noticed a distinct jarring pulsation of my pillows: I got up and went to a western window and then I heard a continuous dull rumble or series of rapidly following explosions, in a direction about W.N.W. of Hastings Rocks; I listened to this till 3 o'clock before going to sleep again. In the morning I first noticed a heavy dark blue-black cloud all over the horizon from about W.S.W. to N.W. and reaching up about 30°, while all the sky seemed shrouded in a light brownish veil; by 7 a.m. the sun was shining through this brown veil with a pale greenish light and by 9 a.m. the dust had began to fall. At first I thought the particles were very large and heavy but found that on touch they crumbled to a fine impalpable powder, so apparently they fell through a little rain or mist.

'It would appear at present that we may expect this present fall to have a slightly higher fertilizing power than the last, since its valuable constituents can become more rapidly available owing to the finer texture of the particles.' The dust has been submitted to a preliminary microscopic examination by Dr. Longfield Smith who reports:—

'I have examined the volcanic dust which fell here on October 16, 1902, and find it to be of much finer texture than that which fell between May 7 and 8, all the grains being less than 1 millimeter diameter, while 77·37 per cent. of the dust from the former eruption of the Soufrière was coarser than 1 millimeter.

'I collecteddust at "Nonpareil", Hastings, every hour from 9.15 till 2.15 and then from 2.15 till 3.45, and found very little difference in texture or composition between the successive samples.

'The particles consist chiefly of minute fragments of felspar with a little volcanic glass, some ferro-magnesian minerals and a very little magnetite.

'The dust differs therefore considerably in composition from that which fell on May 7 and 8, which consisted largely of ferro-magnesian minerals and contained a considerable amount of magnetite.

'On this account the dust is likely to prove of greater fertilizing value than that of May 7 and 8.'

POULTRY.

As announced in our last issue Mr. Barclay now proceeds to the important question of 'Housing Poultry':—

In our West Indian climates fowls need no shelter from cold but they are the better for shelter from rain where it is frequent. It is natural for fowls to roost upon trees, and they prefer to do so but the disadvantages are many. In the first place you cannot go in the evening, and run your eyes along the roost to see if they are all there, as you can when they are housed; secondly you lose the droppings, a valuable item on small properties; thirdly you cannot catch a fowl for any purpose, such as treating it for sicknesss, without much chasing and fuss, both to be deprecated; and fourthly, you cannot command that cleanliness which is most desirable, the fowls soon soil the branches, they roost all about through the trees, and droppings fall from those roosting high, on to those below, and this tends to disease breaking out.

A SIMPLE HOUSE THE BEST.

The simplest housing is the best;—a few hardwood posts, rafters and metal sheets, boards, shingles or thatch put over; the ends on which the winds blow may be wattled thickly, and wire netting or a more open wattling put on the other sides, and the building need not be high, seven or eight feet is enough; a gate is necessary and a padlock is advisable. One corner should be closed in by itself, and boxes fitted in for nests, soft grass put in, and an earthenware nest-egg also put in each, for if hens' eggs are used in the nest they become rotten, may sometimes be taken out in mistake for good eggs, or they may get broken and pollute the neighbourhood for awhile. Straight rounded roosts should be fitted in at different heights, as some fowls may not be able to fly very high, and others prefer to roost as high as they can get. No roosts should be placed higher than your head so that the fowls may always be within reach. It is best to keep roosts low, two to four feet from the ground so that heavy fowls may not hurt themselves flying down. If there is any difficulty in getting the fowls to take to the house a little run should be enclosed in front, and they should be fed there in the evening and when they are shut in they have no option but to roost in the house. It is best always to have such a little closed run.

HOUSES SHOULD BE KEPT CLEAN.

Fresh earth should be flung under the roosts every day to catch the droppings, and these should be cleaned out every day where a good number of fowls are kept and at frequent intervals, say, every second day, no matter how few fowls are kept; this job is the work of a few minutes only. You may either put the cleanings into an old barrel until it is full and then use the manure, or apply it at once to some crops. Plenty of earth must be used to mix with the droppings as they make a very strong, burning, manure if used alone.

Chickens should always be reared, if possible, apart from your hens, they thrive much better then. Many mysterious deaths among young chickens, healthy an hour or two before, are due to knocks on the head from old hens.

ALTERNATE USE OF TWO PENS.

When hens must be confined, two pens should be provided, so that they may be used alternately, say every month. This prevents that fouling of the ground which is the most common cause of disease here, and the soil in each pen should be turned over, so as to freshen it, and bring up a fresh supply of grit or little stones for the fowls to pick up; and the rest allows the grass to grow. Pigeon peas should be planted for shade in each pen. Fowls always confined in pens must have a big heap of refuse, leaves, grass, dust or stable manure provided for them to scrape among, and their food should be flung in the heap to keep them busy.

MODEL HOUSE WITH FOUR RUNS.

Another plan is valuable for people who live in the suburbs of towns, and wish to keep both a garden and fowls. By planning the fowl house with spare or alternate runs all round it, even several varieties of fowls may be kept, or chickens reared without touching the garden; and the ground may still be kept quite fresh.

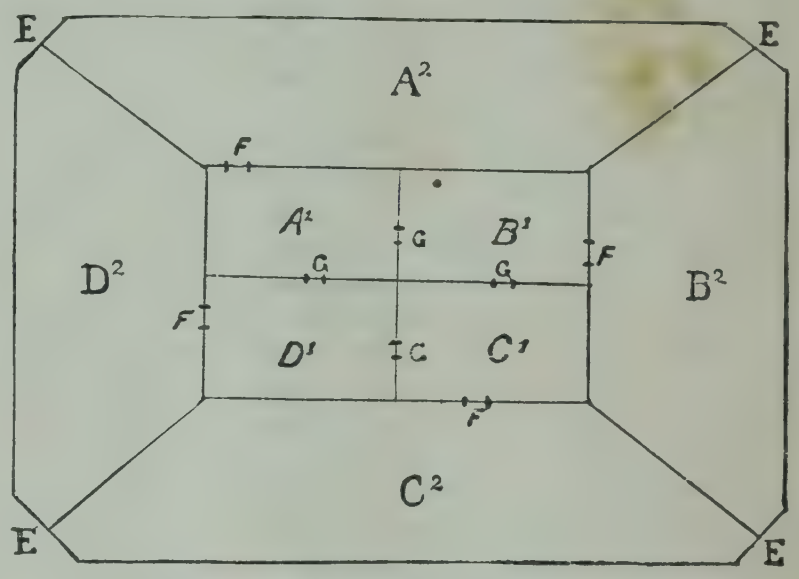
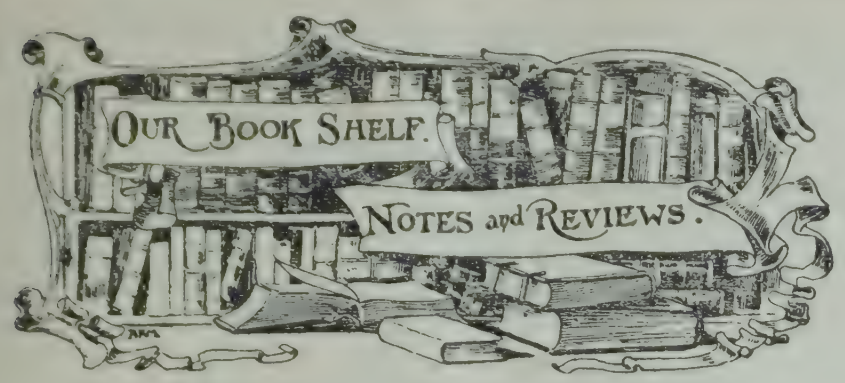


Fig. 15. Diagram of Fowl House and Runs.

A¹. B¹. C¹. D¹. Square or oblong house divided into four, by cross partitions. A². B². C². D². Runs. E. Gates into runs. F. Small wire gates into houses. G. Holes with slide to pass the fowls into fresh house and run.

The gates into the pens are made at the corners so that one hinge post serves; a small wire netting door serves for the entrance to the pens.

Great care must be taken to clean the house daily and sprinkle sand or dry earth on the floor. When the grass in pen A is bare and the ground begins to get foul, the hens are put in pen B.—The soil in pen A is then turned over and pigeon peas planted round the sides, while tomatos, lettuce, cabbages, lima beans, or other vegetables are planted. No manure is needed, the soil having been made rich by the fowls. When pen B becomes bare, the fowls are shifted to pen C and the soil in the former is turned over and planted like pen A. Allowing a month's occupation to each pen, any kind of vegetables may be grown before the round is made to pen A, where the tomatos etc., planted three months before have all ripened and been used, while the pigeon peas have grown up out of reach of the fowls and serve for shade, besides bearing a good food crop. This plan may be simplified or elaborated.



PROGRESSIVE LESSONS IN SCIENCE. By A. Abbot, M.A., (Oxon.) and Arthur Key, M.A., (Oxon.) *Messrs. Blackie & Sons, Limited, London, 1899.* Price 3*s.* 6*d.*

The subject matter of this book is not so wide as the title would lead us to expect, it is confined to the chemistry of those substances which are found in animal and vegetable tissues.

Part I. gives an elementary account of the chemistry of the non-metallic elements found in plants and animals and of a few of their more important mixtures and compounds. Thus we get chapters on water, air, oxygen, sulphuric, nitric and hydrochloric acids, chlorine, ammonia, carbon dioxide, etc. Besides, these we have some account of the theory of chemistry in chapters on 'Acids, Bases and Salts,' 'Laws of Chemical Combination,' 'The Atomic Theory,' 'Chemical Nomenclature,' 'The Equivalent,' and 'The Combining Volumes of Gases.'

The great merit of this part of the book is the way in which every fact is taught as the result of an experiment, which is actually performed by the student. This is undoubtedly the only method of truly teaching science. Some of the experiments however, for proving the laws of chemical combination (Chap. xvii.), and for determining the equivalent (Chap. xix.), appear to require a much higher degree of technical skill than can be expected from a young student, and these would have to be given as demonstrations by the teacher.

A fault, that is frequently met with, and which would tend to render the book unsuitable for a beginner lies in the way in which scientific terms are used before they have been properly explained. Thus we are told that 'air is a mixture of two gases (p. 23), and the terms 'element' and 'compound' are frequently used before any definition or explanation has been given of what is meant by 'element,' 'compound' 'mixture.'

Part II consists mainly of experiments for determining qualitatively, the presence of the elements found in blood, various animal and vegetable food-stuffs and in soil. The tests are easy to perform and the subject matter is novel and should prove very interesting. The subject is an important one and is thoroughly worked out here; thus in the chapter on phosphorus we are first given the ammonium molybdate test for phosphates and then we test for phosphate in the ash from blood, bone, brain, milk, seeds, filberts, fruits, yolk of egg, fish, and in garden soil, granite and phosphatic manures. The chapters on the other elements are similarly complete. The last three chapters give a complete, qualitative analyses of different food-stuffs, milk, eggs, etc.

ARBOR DAY.

A correspondent of the Demerara *Argosy* writes thus in reference to the observation of an Arbor Day in the West Indies:—

I notice Dr. Morris continues to advocate in the current number of the *Agricultural News*, the observation of Arbor Day in the West Indies. A number of islands have already taken steps to give practical effect to the suggestion. It is very important that each Colony should make a point of substituting young growths for the trees which are annually cut down in the way of trade or otherwise. Some of the self-governing Colonies have observed Arbor Day for years, and on the Continent of Europe it is considered a public holiday. In Italy, according to a recent writer, the *Festa delgi Alberi*, or the 'Feast of Trees' has become a popular institution. Its object is the gradual re-afforestation of the country. At the first celebration of the festival no fewer than 1,300 young pine trees were planted, and each year it is intended to plant 1,300 more, so that in course of time a forest of health-giving trees will spread over the Campagna. The Queen of Italy is patroness of the movement, and at the first gathering, in the presence of 30,000 people, she fired, by means of an electric wire, the guns which gave the signal for the commencement of the planting.

Already Sweden has benefited by the wisdom which guided her people of a past generation to adopt such a course; for the town of Orsa, in the course of a generation has sold £1,150,000 worth of trees, and by means of judicious replanting has provided for a similar income every thirty or forty years. In consequence of the development of this commercial wealth there are no taxes. Just imagine that! Railways and telephones are free, and so are the school houses, teaching, and many other things. When will our forest growths be productive of so happy a consummation.

COMMERCIAL INQUIRIES IN THE WEST INDIES.

In a previous number of the *Agricultural News* (p. 78) was published a list of officers designated in the West Indies to undertake the duties of receiving and answering commercial inquiries which may be addressed to them either by the Commercial Intelligence Branch of the Board of Trade, or by merchants and British traders who may seek advice. The *Board of Trade Journal*, records that the following additional appointments have been made:

St. Kitts-Nevis	...	The Assistant Treasurer.
Dominica	...	The Treasurer.
Montserrat	...	The First Treasury Officer.
The Virgin Islands	...	The Commissioner.

SOUR-GRASS AND TICKS.

On page 105 of the *Agricultural News* reference was made to the value of sour-grass in warding off the attacks of ticks and other parasites found infesting cattle in some parts of the West Indies, and it was suggested that stock keepers might by observations ascertain whether or not animals fed upon sour-grass were equally liable to infection by ticks. Adverting to the subject Mr. C. T. Murphy of Turner's Hall school, Barbados, writes:—

'With reference to sour grass I have observed that cattle always eat it best when withered; and that those cattle which eat it best rarely have a tick, whilst their hides are loose and glossy. I think that if the grass is cut just as it is about to flower, and cured similar to hay, little or no difficulty would be experienced in getting animals to eat it. I have also found 'Simpsons' spice' valuable in ridding cows of ticks, besides improving their condition.'

GLEANINGS.

Vanilla is said to occur wild throughout British Guiana. It is to be regretted that such a valuable economic plant is not systematically cultivated by the peasantry of that colony.

Several new plantations are being established in the Northern districts of Tobago. Want of transport has hitherto been a drawback to agricultural development, but now that a steamer plies along the coast, better facilities exist, enabling cultivators to dispose of their produce.

Far more rice is consumed in British Guiana than is produced in the colony. Last year the quantity imported amounted to 20,000,000lb It is encouraging to note as we have already pointed out (p. 152) that the imports are steadily decreasing owing to the increased quantity grown locally.

It would appear from specimens recently determined by Dr. Urban that the 'swizzle stick' tree of Grenada is *Myrodia turbinata*, a tree of the silk cotton order. It grows to a height of 30 to 50 feet.

The 'Coolie Tamarind' or 'Carambola' tree *(Averrhoa Carambola)*, is somewhat attractive when fruiting. The tree is of small dimensions, the flowers are pinkish in colour, and the yellow fruits large and angular. When slightly over ripe the fruits are by no means unpleasant to the taste, partaking of the flavour of gooseberries. They are, however, too acid in the raw state, but form an excellent preserve.

Several new experiment plots have been started at the Tobago Botanic Station. The plots previously planted have made good progress, especially those of the Central American and Lagos silk rubbers.

Antigua exported last year 3,011 barrels and 58 crates of pine-apples. Each barrel held, on an average, four dozen fruit.

St. Vincent Botanic Station contains a healthy specimen of the Souari or Butter nut tree, raised from seed imported from British Guiana. The tree which is six years old, is now 12 feet in height and its spread of branches 7 feet. The Curator would be glad of information as to the age at which this tree begins to bear fruit.

Vanilla is one of the economic plants under experimental cultivation at the Tobago Botanic Station. Steps have been taken to propagate it and this year enough plants will probably be available to fill a small experiment plot.

The canes in Barbados are, on the whole, backward for the season of the year, and there is at present every prospect of a short crop.

Twenty-five colonies of bees at the Antigua Botanic Station have been 'Italianized' by queens raised from one imported pure-bred Italian queen.

Dholl and pulse (dried split pigeon peas) might be grown in British Guiana to an extent sufficient to supply partially, at least, the requirements of the Colony in this direction. The imports in these articles amounted last year to 5,180,000 lb., worth $97,623.

Peasant proprietors in Tobago have been experiencing some trouble from the rats from the neighbouring forests which destroy the young cacao pods and are a great drawback to cultivators. Measures have however been taken for annihilating the rats by poison.

A trial was made at Antigua of the Porto Rico variety of pine-apple. They grew well and produced excellent fruits averaging 10 lb. apiece.

Experiments in pickling and otherwise preserving pork are being carried out in Barbados, under the direction of a committee appointed by the local Agricultural Society. The results, so far, are distinctly encouraging.

Large deposits of phosphates and guano occur in Porto Rico and the neighbouring islands, particularly at Caja de Muertos, about 8 miles from Ponce Harbour.

Seeds of *Chrysanthemum coccineum* and *Chrysanthemum cinerarifolium* were received at the Tobago Botanic Station. They germinated freely, but the plants gradually died. These plants, it may be mentioned, furnish the chief ingredients of insect powder.

One of the heaviest rainfalls at the Botanic Station, St. Vincent, during the last twelve months is reported to have occurred on October 8, when 2·64 inches were registered, of which 2·00 inches fell in one hour.

Prizes of $50 and $10 respectively, have been offered by the Governor of British Guiana for the best samples of vanilla and Brazil nuts cultivated in the colony, the quantity in each case to be not less than 10lb.

Several varieties of cassava grown at the Botanic Station, Tobago, have given fair results. The yellow variety introduced from Trinidad is reported as one of the best for table use, but if planted in damp soil or left too long in the ground, it soon decays.

Improvements recently effected in the drainage of the Demerara Botanic Gardens will enable land which has been abandoned as swamp for many years to be taken up, and it is proposed to requisition the Board of Agriculture for a sum of $200 to enable experiments to be made in growing various kinds of rice from India and Ceylon.

The coal deposits of Trinidad have recently attracted a considerable share of attention. The existence of several seams had been known for many years and last year other discoveries were made. Borings are being made and the coal has been analysed.

Mr. F. J. Seard, F.I.C., has been appointed a member of the Board of Agriculture for British Guiana.

ANTIGUA: REPORT ON THE BOTANIC STATION. 1901-02. By Mr. W. N. Sands, Curator.

The report briefly records the progress made during the season in the ordinary work of the Station. Amongst the items of more particular interest we notice the continuation of the experiments with a 'Peasant's Garden.' In 1900-01 one-tenth of an acre was cultivated in exactly the manner a peasant could adopt and the produce was sold in the open market. After the payment of all expenses a profit of £1 remained. During 1901-02 the experiment was continued; the area was increased to one-seventh of an acre, and £1 was spent in manure and still a profit of over £1 obtained. Some dozen trees have been tested in a re-forestation experiment, and the results indicate that mahogany and 'White cedar' (*Tecoma leucoxylon*, the 'White wood of of Barbados) are well adapted to this purpose. The year was exceptionally wet, the rainfall being 69·3 inches, about 27 inches in excess of the previous year. The results of the economic experiments carried on in connexion with the garden have been published in a separate report. (Reviewed in *Agricultural News* p. 205).

DOMINICA: REPORT ON THE BOTANIC STATION; AGRICULTURAL SCHOOL PLOTS; AND CACAO EXPERIMENT PLOTS, 1901-02. By Messrs. J. Jones, D. Tannock, and G. Whitfield Smith.

Botanic Station. A model hot air cacao-drying house has been erected and has proved very successful. Over 60,000 plants were distributed besides large quantities of seed. Information is given as to different varieties of pine-apples which have been cultivated and the results of trial shipments to England.

Attention is drawn to the spineless lime and the result of an analysis of the juice of this and of the ordinary lime is given. Trial shipments of onions to New York have been successful, one shipment realized $2.50 per crate of 50 lb. Trial shipments of bananas to London again proved the value of proper packing in crates.

The report indicates clearly the very useful work which has been in the past, and still is being carried on at this Station. Work which cannot fail to have a marked effect on the agricultural prosperity of the island.

Agricultural School Plots. Experiments in onion growing have been made, one with seed from Teneriffe, the other with sets. Several varieties of yams, sweet potatos, tannias, plantains and pigeon peas have been cultivated. Experiments with English vegetables have been made and there is a good demand for them locally and by passing steamers.

Cacao Experiment Plots. The results obtained from these plots are given and suggestions for rendering them of greater value.

DEPARTMENT NEWS.

Dr. R. Hamlyn-Harris, D.Sc., F.E.S., F.Z.S., F.R.M.S., arrived from England on the 10th. instant, and has been temporarily attached to the Imperial Department of Agriculture as Honorary Assistant Entomologist. Dr. Hamlyn-Harris is a son of the late Captain Hamlyn-Harris, of the Eighteenth Hussars, and a nephew of Captain C. R. Harris R.N. of 'Mount Wilton' and 'Farmers' estates, Barbados.

The Annual Reports on the Botanic Station, Agricultural School plots, and Cacao experiment plots at Dominica and on the Botanic Station, Antigua have been published.

THE SOILS OF BARBADOS.

In reply to a letter addressed to the Commissioner of Agriculture for the West Indies respecting the sources whence the present soils of Barbados have been derived, the following information has been furnished briefly discussing the subject:—

With reference to the inquiry whether Barbados is not indebted to successive eruptions of the St. Vincent Soufrière for her soil, I may mention that the derivation of the soils and surface deposits of that island are very clearly and fully described at pp. 50-56 of the *Geology of Barbados* by Messrs. Harrison and Jukes-Brown 'published by authority of the Barbados Legislature' in 1890.

There can be little doubt that the soils of four-fifths of the total area of Barbados, viz:—the red clays and loams, as also, the black earths have, for the most part, been derived during the process of ages from the underlying coral rock. The competent authors of the work, above referred to, state: 'The basis of every soil is the subsoil or rock formation which underlies it, that is to say, the slow disintegration (or breaking up) of the underlying rock material by the various surface agencies to which it is exposed gives rise to the loose earth which we call soil'.

The traces of old volcanic ash and sand appear to be confined to a very small portion of the island and are interstratified with oceanic deposits showing the existence of active volcanoes somewhere in the Caribbean region during the period of the accumulation of these deposits. The amount of volcanic ash that in recent times has fallen on the island and been added to form the present soil is scarcely worthy of consideration either from its bulk or its power of enriching the land. The amount of ash that fell in 1812 averaged only about three-eighths of an inch in depth and the ash that fell this year was of about the same depth. The aggregate weight of ash that has fallen all over the island during recent times would appear considerable if stated in tons, but it would not form, probably, more than one per cent. of the total weight of the present soil of Barbados.

It is rather singular that in view of the very reliable account given by Messrs. Harrison and Jukes-Brown of the origin of the soils of Barbados, the idea should have been adopted that the island, as it now exists, 'is indebted to successive eruptions of the Soufrière in St. Vincent for her soil.' As it has been endeavoured to show above, there is apparently little or no grounds for such an idea. To those who are particularly interested in the subject, I recommend that the work already referred to above may be carefully studied.

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—Sept. 30, 1902.—Messrs. J. Hales Caird & Co., Messrs. Gillespie Bros. & Co. and 'The Public Ledger,' Sept. 20, 1902.

Aloes—Curaçoa, 10/- to 40/-; Barbados 13/- to 35/- per cwt.
Arrowroot—St. Vincent, 3*d* to 5*d* per lb.
Balata—Venezuelan, 2/- to 2/5½ per lb.
Bees-wax—Jamaica, fair reddish to pale £7 5/- to £7 17/6 per cwt.
Cacao—T'dad, 56/- to 85/- per cwt. Dominica 56/- to 57/- per cwt. Grenada, ordinary to fine 52/- to 65/- per cwt. Jamaica, 54/- to 63/6 per cwt.
Cardamoms—Mysore, 1/- to 3/- per lb.
Cassia Fistula—5/6 to 35/- per cwt.
Coffee—Jamaica, 22/6 to 125/- per cwt. Costa Rica, 37/- to 99/- per cwt. Peaberry 75/- to 115/- per cwt.
Cotton—West Indian 4⅞ to 5⅜*d*. per lb.
Fustic—£3. 10/- to £4. 10/- per ton.
Ginger—Jamaica, common to fine 35/6 to 50/- per cwt.
Honey—Jamaica 14/- to 21/- per cwt.
Jalap—4*d* to 6*d* per lb.
Khus-Khus Root—12/- per cwt.
Kola Nuts—1*d* to 4*d* per lb.
Lime Juice—Raw, 1/- to 1/2 per gallon; concentrated, £11 10*s*. to £12 per pipe.
Logwood—Jamaica, £4 2*s* 6*d*. to £4 7*s*. 6*d*. per ton.
Mace—1/2 to 2/10 per lb.
Nitrate of Soda—Agricultural £8 15*s*. per ton.
Nutmegs—90's to 60's @ 1/1*d* to 2/7, 132's to 95's @ 7*d* to 1*s* per lb.
Pimento—2½*d*. to 3*d*. per lb.
Sarsaparilla—Jamaica fair 8*d*. to 1*s*. 4*d*. per lb.
Sugar—Muscovado, 11/6 to 13/6 duty paid; crystallized 12/9 to 15/- per cwt.
Sulphate of Ammonia—Grey, 24 per cent., London £12 5*d* per ton.
Tamarinds—Barbados 12/- to 15/6 per cwt.
Tonquin Beans—1*s*. to 2/6*d*. per lb.
Fruit—Covent Garden Market ('Gardeners' Chronicle,' September 25, 1902.)
Bananas—8/- to 12/- per bunch.
Oranges—Naples 15/- to 26/- per case.
Pines—2/6 to 4/- each.

Halifax N.S.—'The Maritime Merchant', Sept. 25, 1902.

Bananas—$1.75 to $2.25 per bunch.
Molasses—Barbados 24c. to 25c. per gallon.
Oranges.—Jamaica, $5.00 per case.
Sugars—Demand very active, market firmer.

New York,—October 3, 1902.—Messrs. Gillespie Bros. & Co.

Cacao—African, 13¼c. to 13⅜; Caracas, 13¾c. to 14¼c.; Jamaica, no stock: fair ordinary, 11¼c., good fermented 12c. to 12½c.; Grenada, 13¼c. to 13½c.; Trinidad 13c. to 14⅛c. per lb.
Cocoa-nuts; Small Trinidads no demand $12.00; Jamaicas $23.00 to $25.00 per M.
Coffee—Rio, good ordinary 5 15/16c. to 5½c.; Jamaica good ordinary 6c. to 7c. per lb.; Manchester grades 8½c. to 11c. per lb.
Grape Fruit—$7.00 to $12.00 per barrel.
Oranges—$3.75 to $4.25 per barrel.
Pimento—4½ to 4⅝c. per lb.
Rubber—Nicaragua Scrap 52c. to 53c. per lb; sheet 42c. to 44c. per lb.; Guayaquil Strip 48c. to 51c. per lb.
Sugar—Muscovado, 89°, 3c. per lb.; Centrifugals, 96°, 3½c.; molasses, 89°, 2¾ per lb.

INTER-COLONIAL MARKETS.

Antigua,—October 8, 1902.—Messrs. G. W. Bennett, Bryson & Co., Ltd.

Molasses—10c. per imperial gallon, package included.
Sugar—Muscovado $1.30 per 100lb.

Barbados,—October 11, 1902.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—good quality, $4.00 per 100 lb.
Cacao—$14.00 per 100 lb. Wanted.
Coffee—Jamaica and ordinary Rio $8.00 to $9.00 per 100 lb. respectively.
Hay—New Brunswick 90c. per 100 lb.
Manures—Nitrate of Soda $60.00 to $65.00; Ohlendorff's Dissolved Guano; $60.00; Sulphate of Ammonia $75.00 to $80.00; Sulphate of Potash $70.00 per ton.
Molasses—No quotations.
Onions—Madeira $1.80 to $2.17 per 100 lb.
Potatos—$2.35 to $2.50 per 160 lb.
Rice—Ballam $4.60 per bag (190 lb.); Patna $3.75 per bag (190 lb.); Rangoon $3.00 per bag (190 lb.)
Sugar—$2.40 per 100 lb.

British Guiana,—October 9, 1902.—Messrs. Weiting & Richter.

Arrowroot—$10.00 per barrel.
Cacao—native 11c. to 13c. sales.
Cassava Starch—$8.00 per barrel.
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica 11c. to 11½c. per lb. (retail.) Creole, 11c. to 12c. per lb.
Eddoes—$1.80 per barrel.
Onions—Retail 3c. to 3½c. Garlic 8c. per lb.
Pea Nuts—Curaçoa 3¾c.; American 5c. (retail.)
Plantains—20c. to 36c. per bunch.
Potatos English—$3.00 per barrel.
Rice—Ballam $4.75 to $4.80, ex store; Patna $5.80, to $5.90 per bag. Seeta $5.80 to $5.90
—Creole Rice 20c. per gallon, (retail.)
Sweet Potatos—Barbados $1.68, Creole $1.20 per barrel.
Tannias—$1.80 per bag.
Yams—$2.64 per bag.
Molasses—Vacuum Pan, yellow, 14½c. tc 15c. per gallon, casks included.
Sugar—White $3.50; Dark Crystals $1.71 to $1.78; yellow $2.10 to $2.25.; Molasses—$1.50 to $1.60 (nominal) per cwt.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—October 9, 1902.—Messrs. Gordon Grant & Co., and Messrs. Edgar Tripp & Co. October 10, 1902.

Cacao—Ordinary to good red $12.75 to $13.00; estates, $13.25 to $13.50 per Fanega.
Balata—Venezuelan 42¼c. to 43c. per lb.
Coffee—Venezuelan 7c. per lb.
Onions—$2.25 per 100 lb.
Potatos English—$1.20 to $1.30 per 100lb.
Rice—Yellow $4.55 to $4.75; White Table $5.25 to $5.75 per bag.
Sugar—For Grocery use, $1.60 to $3.00 per 100lb.

DEPARTMENT PUBLICATIONS ON SALE.

The 'WEST INDIAN BULLETIN.' A Quarterly Scientific Journal.

Volume I. Reports of the Agricultural Conference of 1899 and 1900 and other papers; complete, in the original paper covers as issued, post free, 5*s*. The parts can no longer be sold separately.

Volume II. Full report of the Conference of 1901, and other papers. Price, in original paper covers as issued, post free 2*s*. 9*d*.

Volume III. No. 1. Agricultural Conference of 1902: President's Address and Sugar Industry. No. 2. Conference of 1902 (continued). Educational and General Papers. Price 6*d*. Post free 8*d* each. No. 3. Sugar Industry, Scale Insects, School Gardens, Object Lessons, Volcanic Phenomena, Ground nuts etc., (in the press.)

PAMPHLET SERIES.

(3.) Seedling and other Canes at Barbados 1900. Price 2*d*. Post free 2½*d*. (5.) General Treatment of Insect Pests, 2nd Edition Revised. Price 4*d*. Post free 4½*d*. (6.) Recipes for cooking Sweet Potatos. Price 2*d*. Post free 2½*d*. (7.) Scale Insects of the Lesser Antilles. Price 4*d*. Post free 5*d*. (8.) Cultivation of Vegetables in Barbados. Price 2*d*. Post free 2½*d*. (9.) Bee-keeping in the West Indies. Price 4*d*. Post free 5*d*. (10.) Manures and Leguminous Plants at Barbados, 1898-1901. Price 4*d*. Post free 5d. (11.) Hints for School Gardens. Price 2*d*. Post free 2½*d*. (12.) Seedling and other Canes in the Leeward Islands, 1900-1901. Price 2*d*. Post free 2½*d*. (13.) Seedlings and other Canes at Barbados, in 1901. Price 4*d*. Post free 5*d*. (14.) Screw Worm in Cattle at St. Lucia. Price 2*d*. Post free 2½*d*. (15.) Plain Talk to Small Owners. Price 2*d*. Post free 2½*d*. (16) Hints on Onion Cultivation, Price 2*d*. Post free 2½*d*. (17) General Treatment of Fungoid Pests, Price 4*d*. Post free, 5*d*. (18) Recipes for Cooking West Indian Yams, Price 2*d*. Post free, 2½*d*. (19.) Seedling and other Canes at Barbados, in 1902. Price 4*d*. Post free 5*d*. (20.) Seedling and other Canes in the Leeward islands. Price 2*d*. Post free 2½*d*.

'NATURE TEACHING.' A text book based upon the general principles of Agriculture for the use of schools. Prepared by the Honourable Francis Watts and others. (Pages 12 and 199). Price, limp cloth 2*s*., in superior binding 2*s*. 6*d*. Postage, 3½*d* extra.

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Agents for the sale of the publications of the Department:—

London: Messrs. DULAU & Co., 37, Soho Square, W. *Barbados:* Messrs. BOWEN & SONS, Bridgetown. *Jamaica:* THE EDUCATIONAL SUPPLY COMPANY, 16, King St., Kingston. *British Guiana:* The 'Daily Chronicle' Office, Georgetown. *Trinidad:* Messrs. MUNRO, & Co., Frederick St, Port-of-Spain. *Tobago:* Mr. C. L. PLAGEMANN, Scarborough. *Grenada:* Messrs. F. MARRAST & Co., 'The Stores,' St. George. *St. Vincent:* Mr. W. C. D. PROUDFOOT, Kingstown. *St. Lucia:* Mr. R. G. MCHUGH, Castries, *Dominica:* Messrs. C. F. DUVERNEY & Co., Market St. Roseau. *Montserrat:* Mr. W. LLEWELLYN WALL, Plymouth: *Antigua:* Mr. F. FORREST St. John's. *St. Kitts:* Messrs. S. L. HORSFORD & Co., Basseterre.

TO THE PLANTING WORLD. **Seeds & Plants of Commercial Products.**

HEVEA BRASILIENSIS. Coming crop of seeds August-September shipment. As orders must reach us at least at the end of July to avoid disappointment, ordering by wire necessary on the appearance of this advertisement. There is only one crop in the year. A leading Sumatra planter who purchased 150.000 seeds on two previous occasions writes under date May 10, 1902: 'I shall like to have your lowest terms for delivery of 100,000 Hevea seeds in the same way as before from the coming crop.' 75% guaranteed to germinate. Shipments to West Indies can be made to London only: re-shipment must be arranged by purchasers.

For special offer of seeds and plants see the following descriptive Price Lists, post free on application.

1. Tropical Seeds and Plants of Commercial Products, enlarged edition for 1902.
2. Seeds and Plants of Shade, Timber, Wind-belts, Fuel, and Ornamental Trees, Trees for Road-sides, Parks, Open Spaces, Pasture Lands, Avenues, Hedges, and for planting among crops (Tea, Coffee, Cacao, Cardamons, etc.)
3. Seeds and Plants of Tropical Fruit Trees including Mango grafts. 4. Bulbs, Tubers and Yams.
5. Orchids—Ceylon and Indian. 6. Seeds and Plants of Palms, Calamus, Pandanus, Cycads, Tree and other Ferns, Crotons, Roses, Dracaenas, Shrubs and Creepers.

SPECIAL ARRANGEMENTS made with foreign Governments, Botanical and Agricultural Departments, Planters, and others for supplying seeds and plants of Commercial Products in large quantities.

AGAVE LURIDA. This highly recommended fibre yielding plant yields a fibre equal to that of *Sisal* in lustre and tensile strength valued at from £28 to £34 per ton in London. Bulbils (seedlings) £1 per 100, £8 per 1,000 post free: special quotations for large orders.

COFFEE. Arabica-Liberian Hybrid and Maragogipe Hybrid—New crop March-April, 1903: early booking necessary.

A Foreign Agricultural Department writes dating 9th September, 1901:—"Please accept our order for 175 lb. of Tea seed and for 2,000 Coffee beans. In regard to Coffee seed I would say that this will be the first importation made by this Department, and we will leave the selection of the varieties to be sent to your judgement."

"SOUTH AFRICA."—The great authority on South African affairs of 25th March, 1899, says:—An interesting Catalogue reaches us from the East. It is issued by William Brothers, Tropical Seed Merchants of Henaratgoda, Ceylon, and schedules all the useful and beautiful plants which will thrive in tropical and semi-tropical regions. We fancy Messrs. Williams should do good business, for now that the great powers have grabbed all the waste places of the earth, they must turn to and prove that they were worth the grabbing. We recommend the great Powers and Concessionaries under them to go to William Brothers."

Agents in London: Messrs. P. W. Woolley & Co., 90, Lower Thames Street.

Telegraphic Address: WILLIAM HENARATGODA, Ceylon.
[14.] Lieber's, A.I. & A.B.C., Codes used.

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Total Assurances Issued	$11,813,382
Total Bonuses Declared (31 December 1900)	3,610,921
Sums Assured and Bonuses Existing	5,060,468
Total Claims by Death and Matured Endowments	5,451,158
Life Assurance Fund	2,143,840
Annual Income	257,983
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May 22, 1902.

H. J. INNISS,
Secretary.

[16.]

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AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. I. No. 15. BARBADOS, NOVEMBER 8, 1902. PRICE 1*d.*

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Utilization of Home Products.

AMONGST the causes responsible for the present agricultural depression in the West Indies, particularly in the sugar-producing islands, must be placed the high profits formerly obtained from sugar cultivation. In the days before the beet became an important factor in the sugar trade of the world the sugar-cane yielded relatively enormous returns and planters made every effort to extend the area under sugar-cane cultivation. To this end valuable fruit and other trees were cut down, poor lands prepared at great cost, and, in fact, scarcely any sacrifice was thought too heavy so long as it led to an increase of the output of the staple crop.

With sugar selling at £20 to £30 per ton, or even more, there is no doubt that the planters of those days followed the most remunerative course. It would have been unprofitable for them to devote to the production of Indian corn, yams, etc., land which would yield sugar to the value of say £50 per acre. Canes were accordingly grown on every available acre and the sugar exported, whilst importations were depended on for the necessaries of life.

In the sugar islands of the West Indies, this course is still followed, to a large extent, in spite of the great changes in the sugar industry. A ton of sugar formerly sold for £20 or £30, now it is worth $20 to $30. Yet in too many cases the planters' best energies are devoted to producing sugar, often to be sold at a loss, whilst relatively enormous amounts of foodstuffs and other articles are imported, a great part of which could and should be produced locally.

As a first step towards the desired end more use needs to be made of products which are now exported. Experiments made in Europe, America, and in the West Indies, in Experiment Stations, with army horses, and by private individuals, have conclusively proved the high value of molasses as a feeding stuff for

animals. It is stated on good authority that 'cane molasses has the same feeding value as an equal weight of corn.'

On pages 108-124 of the *Agricultural News* we gave an account of the experiments carried out in Porto Rico, where army horses kept in excellent condition and did their full work on grass and molasses only, each horse taking 14 lb. of molasses daily. The old custom, however, is still maintained in these colonies and molasses is sold at very low rates and exported, whilst thousands of bushels of high-priced corn and oats are imported annually from the United States.

A second means of remedying the present non-economical state of affairs lies in the home production of many articles now imported. The proposed re-introduction of cotton may prove a step in the right direction, if care is taken to utilize the cotton seed and its products to their best advantage. They must not be exported for a mere trifle but should be employed to reduce the very heavy importations of oil meal, oil cake and cotton seed oil, of which the imports into Barbados were of the value of £24,000 in 1900, and into the Leeward Islands about £5,000 in the same year.

Numerous other opportunities for reducing expenditure could be cited, but the essential point is this. In the sugar-producing islands the staple crop does not now give the profits of former years. Planters need to adapt themselves to the changed circumstances and reduce the importation of food stuffs. At present dear American products are being obtained in exchange for cheap sugar to the impoverishment of the West Indies.

West Indian Insect Injurious in Florida.

A bulletin entitled *Some Insects Injurious to Vegetable Crops* * has recently been received, containing a short account of an insect occurring in the West Indies, found to be destructive to bean and pea plants in Florida. This insect is the 'Swallow-tailed skipper *(Eudamus proteus.* L.) a robust velvety-brown butterfly with white spots on the forewings. In appearance it is similar to the 'Canna or arrowroot skipper' but differs in the swallow-tail prolongation of the hind wings. The insect may now be found in Barbados, Dominica and Antigua, (and probably throughout the Lesser Antilles). Mr. Chittenden enumerates Cuba, Jamaica, Trinidad and several South American localities. No reports have been received of this insect proving destructive to bean or pea plants in the West Indies, and it is believed to feed here on wild plants ; but it is not unlikely to make its appearance in gardens where its food plants are grown.

F. H. Chittenden, Bulletin 33, N.S., Division of Entomology, U.S. Department of Agriculture.

SUGAR INDUSTRY.

British Guiana Notes.

The Demerara *Argosy* for October 22, says:—A few light showers fell during the fortnight, the rainfall registered varying from half an inch to three inches in different localities. The weather during the current month has been quite seasonable and favourable to ripening canes. The younger portion of the cultivation would, however, have derived benefit from heavier showers than those experienced.

SUGAR MAKING.

Sugar making is progressing rapidly. The cane juice is of good quality, and is working up freely, the extraction on indicated sugar in juice averaging 88 per cent. to 90 per cent. of 96° sugar. The yield of sugar per acre is better than was anticipated owing to the low gallons of juice required per ton sugar. The total output of rum this year should not exceed 65 per cent. of that made last year.

MARKETS.

There is a firmer tendency in the sugar market, and last sales of 96° crystals were made at $1.80 per 100 lb. The rum market is still overstocked and only a lessened production will put this market right. The net value of 40 over proof coloured rum is about 20 cents a gallon.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following interesting article on the recent sales of West Indian drugs and spices has been contributed by Mr. John R. Jackson, A.L.S., formerly Curator of the Museums at the Royal Gardens, Kew:—

In these days, when the value of object lessons is acknowledged on all sides, the samples of raw products to be seen in the Mincing Lane Show Rooms on the eve of the fortnightly drug sales, together with those in the Billiter Square warehouse and the several docks in the east of London, have proved to be of immense value to numbers of students, who have of late sought to improve their practical knowledge by visits to these great centres of Commerce. The importance of combining the commercial side with the scientific is now fully acknowledged by the ready assistance that is rendered, by business men, to members of pharmaceutical and other classes, by giving permission of occasional access to these stores of knowledge, an opportunity of which teachers and their classes are only too glad to avail themselves, for here is to be seen not only the raw products themselves as originally produced—so useful an item in the knowledge of a pharmaceutical student,—but also the mode of preparation and packing in the several countries of production. All these are important points in the education of one whose future life is to be spent as a planter, or in some

way connected with developing the produce of the soil in one of the numerous Colonies of the British Empire. To the uninitiated a perusal of the *Public Ledger* or of the Reports of the London Produce Market is, to say the least, uninteresting reading; but with the light gained from a few visits to the centre of Great Britain's colonial and foreign trade, such reports become intelligible and even interesting. By watching these reports week by week a great amount of information is gathered as to the supply and demand, the fluctuations in prices, and the conditions in which the various products arrive. There are also occasional notes of new or rarely seen products.

It has been thought that a monthly review of the London clearing market, with special reference to such products as commend themselves to West Indian readers would be an acceptable item in the *Agricultural News*. At the first sale in September, 114 boxes of Curaçoa aloes were partly disposed of at 19*s*. to 19*s*. 6*d*. per cwt., 'dull black' not realizing more than 14*s*., but four boxes of 'fair livery' Curaçoa sold, without reserve, at 21*s*. per cwt., while for seven small tins of 'fine livery' from Barbados 29*s*. was paid. A limited quantity of 'good bright,' but 'soft,' Socotrine fetched 72*s*. 6*d*. per cwt. Arrowroot, as might be expected, was a fluctuating article in consequence of the disturbed state of St. Vincent at the beginning of the month: this quality for ordinary manufacturing was bought in at $2\frac{1}{4}d$. per lb, and Trinidad at 2*d*. for soft quality, while a week later, owing to the renewed volcanic eruption, the price for St. Vincent rose and business was done at 3*d*. to 4*d*. per lb. for 'fair to fine' quality.

Of kola nuts at the first sale 6 barrels fresh Grenada sold at $1\frac{1}{2}d$. per lb. 'Fair, washed' West Indian realizing $3\frac{3}{4}d$., and at the second sale 21 barrels of West Indian were disposed of at $3\frac{1}{4}d$. to $3\frac{1}{2}d$. for good quality, and $1\frac{1}{2}d$. for 'wormy.'

At the sale on September 4, 24 bales of Jamaica sarsaparilla were disposed of at 1*s* 3*d*. per lb. for 'sound' and 1*s*. to 1*s*. 2*d*. for inferior quality; and at the second sale, a fortnight later, 15 bales were sold at 1*s*. 2*d*., and 13 other bales at 1*s*. 3*d*. for 'sound,' and 1*s*. 1*d*. for 'country' damaged, while one bale of 'red Jamaica' fetched 9*d*. per lb.

At the same sale, tamarinds fetched the following prices respectively: Three barrels of West Indian of inferior quality 10*s*. per cwt.; of 27 barrels of Antigua offered, 10 barrels sold at 13*s*. per cwt, while later in the month 10 barrels of good West Indian were bought in at 14*s*. per cwt. and 9 other barrels were sold at 13*s*. 6*d*.

With regard to spices, the following items may be of interest. On September 4, pimento was quoted at $2\frac{3}{4}d$. per lb. for 'greyish,' and $2\frac{7}{8}d$. for 'fair.' On the 11th. 473 packages were offered, 120 of which were sold at the following rates:— 'middling to fair' $2\frac{5}{8}d$. to $2\frac{3}{4}d$. On the 25th. 438 packages were bought in at $2\frac{3}{4}d$. to $2\frac{7}{8}d$. Of mace on September 11, 8 packages West Indian were offered for sale of 'fair pale' and 'reddish,' realizing 1*s* 4*d*. and 1*s* 5*d*. per lb. respectively, while on the 25th. there were 77 packages offered, which realized for 'good pale' 1*s*. 7*d*., 'fair pale' 1*s*. 4*d*. to 1*s*. 5*d*., and 'fair red' 1*s*. 3*d*. On September 18, Jamaica ginger sold at 38*s*. to 40*s*. 6*d*. per cwt. for 'ordinary middling dull', and on the 25th. the quotations were 37*s*. 6*d*. to 38*s*. for 'small dull,' but 'middling dull washed' was bought in at 44*s*. 6*d*. to 46*s*. In comparison with this, at the same sale Cochin ginger sold at the following prices:—82*s*. to 82*s*. 6*d*. for 'bold cut,' 65*s*. for 'medium,' 55*s*. for 'small,' 37*s*. for 'ends' and 35*s*. for 'cuttings.'

COTTON CULTIVATION IN BRITISH GUIANA.

The Demerara *Daily Chronicle* reproduced in a recent issue some extracts from a paper by the late Dr. Shier, a former Government Chemist of that colony, on the subject of cotton cultivation in British Guiana. Dr. Shier's notes, although written more than half a century ago, should be of interest to proprietors in the West Indies who are now turning their attention to cotton growing. We append the following:—

THE COLONY'S SUITABILITY FOR COTTON GROWING.

British Guiana affords numerous advantages over almost any other country in the cultivation of cotton.

The marine atmosphere and saline nature of the coast and estuary soils appear to fulfil exactly the conditions required by the most valuable variety, namely, the sea-island or black-seed cotton. The stray bushes that are left, although degenerated and perennial, are obviously referable to this variety. The land adapted to the sea-island variety in the Southern States of America is fast wearing out, and the richer lands of the interior and west are suited only to the short staple variety, hence, at no distant period, the more valuable sea-island variety will have dwindled down to an inconsiderable amount, and unless supplied plentifully from some other quarter, must bring an enhanced price.

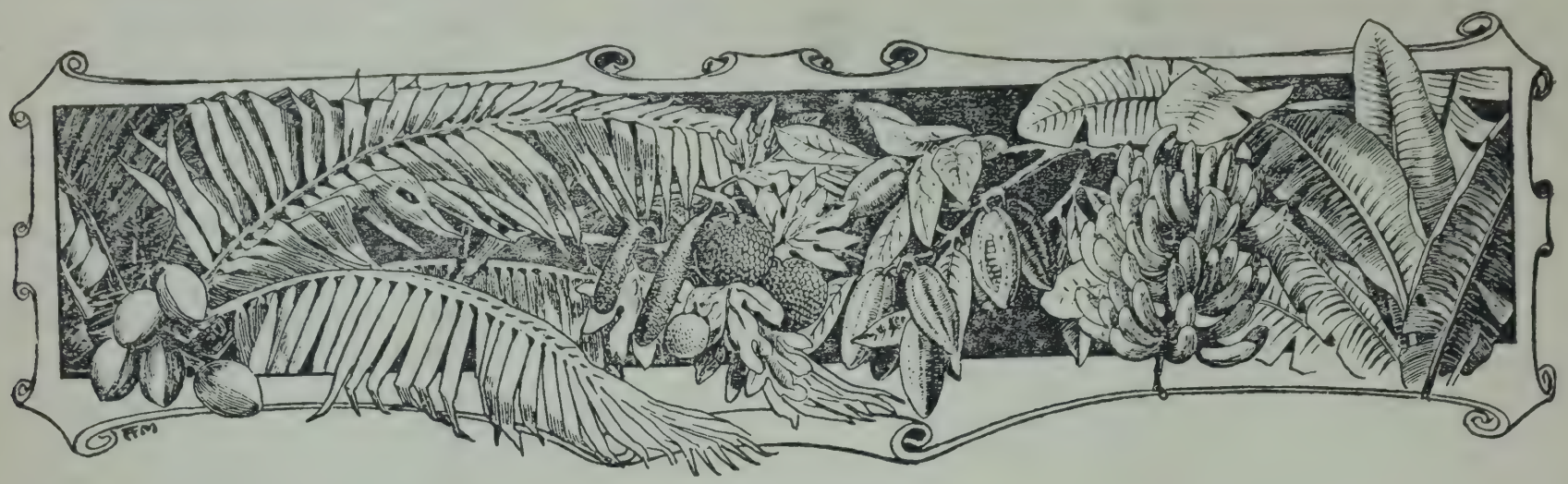
The low lands of the coast side of British Guiana appear to me much richer and more enduring for cotton cultivation than any I have elsewhere seen. The exhaustion I have mentioned as taking place on the sea-board of the Southern States of America arises from the constant stirring and tillage of the thin layer of organic matter which was originally found on the surface over the siliceous sand. The coast lands of British Guiana, however, contain a large amount of organic matter intimately mixed and blended with the clay and that to almost any depth, so that with anything approaching to judicious tillage, exhaustion is not at all to be apprehended. And if it were even to appear that smaller returns occurred from this cause, a speedy and effectual renovation is at all times possible by the method of warping which would be attended with no expense worth mentioning.

A SUPERIOR CLIMATE.

In point of climate I consider the coast side soils of British Guiana decidedly superior to the American sea-board. In the latter there is a decided and well-marked winter, which renders frequent sowing necessary in spring, and which at times operates unfavourably in autumn. The plants have thus but a single period of blossoming, and should the weather prove unfavourable there is no chance of retrieving the loss during the season. The cotton plant is thus rendered an annual by the severity of the winter. In British Guiana, on the other hand, there is abundant opportunity of planting without fear of failure by a reduced temperature, and in consequence of the fineness and uniformity of the seasons the plant becomes, or rather is allowed to remain, a perennial.

CULTIVATION MORE EXPENSIVE THAN IN THE STATES.

It will be objected by others that the stiffness of the soils in British Guiana is such that the labour of cultivating cotton will be greater and more expensive than in the loose soils of the sea-board of the Southern States of America. This must be admitted, but on the other hand, the superiority of the soil and climate, suited also to the finest varieties of cotton, cannot fail to give a return so much greater as more than counterbalances the greater expense of labour.



WEST INDIAN FRUIT.

CULTIVATION OF BANANAS.

The following notes on the cultivation of bananas are reproduced from the paper by the Hon'ble W. Fawcett, B.Sc., F.L.S., read before the Agricultural Conference in January last and published in full in the *West Indian Bulletin*, Vol. II., pp. 153 to 171:—

CLEARING.

In ground covered with forest or woodland some are content to cut down and burn, leaving the stumps to decay; but it is better, if it can be done, so to cut the trees that they will tear up their roots in their fall. The trees should be carefully selected, marked and cut up for their special uses—timber, posts, piles, tramway sleepers, firewood, etc. The underwood and brush can be used to burn up the roots and the trunks of useless trees such as Guango, Bastard Cedar, etc.

The ground should finally be carefully stumped. Even if the land is virgin soil and does not require ploughing, it is better to stump at first. The plants can then be put in at regular distances at once—an important matter in many ways; and if ploughing is necessary at a later period, there is no delay caused by digging out stumps. Stumping also facilitates cutting and carrying the fruit.

If the land is not the virgin soil of a forest, and especially if it be old cane land or pasture, it should be first thoroughly ploughed at least 9 inches deep, and harrowed. If the situation is on hill-sides where the plough cannot be worked, the pickaxe for stony ground, and the fork for soft ground should be used.

DISTANCE.

The usual distance is 15 by 15 feet, or 14 by 14 feet, but these distances are modified according to circumstances, and planters are continually trying experiments with other distances. One planter finds that a hill-side of 15 acres on the north side planted 8 by 8 yields 8,000 straight, or more than 500 to the acre. Another, in a hot, flat district on the south side, finds it advantageous to plant 8 by 8 in order to shade the ground as soon as possible. It is stated by the advocates of close planting that the crop comes in sooner, that it can be regulated with greater success so as to come in during the five months of high prices, and that less weeding and less water are required. On the other hand, it will be found necessary to remove every alternate row for first ratoons, and probably for third ratoons to reduce the field to stems at distances of 16 by 16 feet. Where there is too much shade, the bulbs are apt gradually to grow higher out of the ground with less hold against the wind, and the plants run up with a weak stem and irregular bunch. Another system is to increase the distance between the plants in the row, making the wider intervals run north and south. A planter who reaps 330 payable bunches per acre, planting 14 by 14, gets a yield of 400 per acre where he has planted 10 by 20 feet.

A planter who is planting cacao and utilizes the banana for shade says that he has generally planted 14 feet square with cacao in the same line. If cacao is planted in the centre of the square, field implements, of course, cannot be worked either way, but by planting in the same line as the banana, they can be used for two or more years without apparent injury to either plant. However, he states that, after some experience, he thinks 16 feet square would be preferable both for banana and cacao cultivation, but there are considerations of locality, soil, fertility and so on which prevent a hard and fast line being laid down

'In wide planting there is less risk of a falling tree carrying another with it. The roots of the banana appear to require a radius of at least 8 feet, and wide planting has always commended itself, in my experience, as the best agriculture; that is to say, sufficiently wide planting to give the plant or tree *space* admitting of its full and best development. Among other advantages cultivation is easier; and beyond question the higher the cultivation the better is the fruit obtained.'

DIGGING HOLES.

Some planters are content with shallow holes about one foot deep. But better results are obtained when holes 2 feet 6 inches every way are dug; the roots get a better start, and a better hold on the ground, so that the plants are more forward, and not liable to be blown down.

A planter who prepares holes 3 to 4 feet wide and from 2 to 2½ feet deep, writes:—'It is not always possible to get the labour to make these holes, but I am convinced of the advantage and ultimate economy of making them large and deep, for, among other reasons, the plant gets a start at once; a good root is formed in the loosened earth which practically "anchors" the tree, and enables it to resist high winds, and when planted in this way the tendency of the root to come to the surface is greatly obviated.'

THE IMPROVEMENT OF LOCAL VARIETIES OF INDIAN CORN.

A paper on this subject was read before the Antigua Agricultural and Commercial Society on September 5, by Mr. W. N. Sands, the Curator of the Botanic Station at Antigua, of which the following is a summary :—

During the last few years considerable attention has been given to the growth of Indian corn. This has been brought about by the low price of sugar and the high price of imported corn.

It seems to be the general opinion that the local varieties of corn have become less productive. This seems to be the case also in other West Indian islands.

Experiments have been made at the Scott's Hill Experiment Station on the following lines :—

(1) The selection of seed of the native varieties.
(2) Trials of good American and other varieties.
(3) The crossing of native corn with imported varieties.

(1) Cobs of the finest corn were selected and the seed from them sown in plots. No definite results have yet been obtained, owing to the short time during which the experiments have been carried on. Several planters of the island have carried on selection for a number of years, but the limit of productiveness appears to have been reached.

(2) Numerous varieties of corn were imported from the United States and were grown separately in $\frac{1}{10}$ acre plots. The growth in all cases was feeble, and it was evident that these varieties were not suitable for this climate. On re-sowing, the same result was obtained.

(3) In September 1900, a plot of native yellow corn was planted at the same time as plots of the imported varieties. The 'arrows' or spikes of male flowers of the native corn were cut out; when the arrows of one of the imported varieties (Golden Beauty) were mature, a few were taken and dusted on the tassels of the young cobs of the native corn : this was continued for four or five days.

The best cobs with the crossed seeds were selected and the grain sown by themselves the following May. The corn grew well and was harvested in September. It then showed distinct signs of the crossing, the grains being of a different shape and lighter in colour than those of the ordinary native corn. The best cobs were again selected for sowing.

Three plots of this corn were sown on alternate rows, the other rows being sown with a fresh supply of seed of three American varieties, one variety to each plot. The arrows of the crossed corn were taken out as they appeared ; artificial pollination was not necessary as the plants were mixed.

The corn was reaped in January of this year and the best cobs of the twice-crossed corn were selected for seed.

The selected seed was sown in May on three different plots. The growth was vigorous and there was little insect attack. When reaped on August 8, the following results were obtained :—

CORN IN COB.

(1)	314 lb.	or	3,140 lb.	per	acre
(2)	308 "	"	3,080 "	"	"
(3)	301 "	"	3,010 "	"	"

Of these

(1) 40 lb. of corn in cob gave 32¼lb. of shelled corn, equal to 2,531 lb., or over 45 bushels per acre.
(2) 40 lb. gave 32½ lb. of shelled corn, equal to 2,502 lb., or over 44 bushels per acre.
(3) 40 lb. gave 31½lb. of shelled corn, equal to 2,370 lb., or over 42 bushels per acre.

The average yield of native corn is from 25 to 30 bushels per acre, while these varieties give over 40 bushels per acre.

One or two planters have already grown some of these crossed corns with good results. The seed is available at the Botanic Station and will be distributed at the rate of 1*d.* per lb.

SALE OF HONEY IN THE AMERICAN MARKET.

Mr. Geo. S. Hudson, Agricultural Instructor at St. Lucia, forwards the following information which should be useful to West Indian Honey Shippers :—

Messrs. Gillespie Bros. & Co., New York, of whom Mr. Hudson had made inquiries with reference to honey, wrote on September 30 :—

At the moment there is a very good demand for extracted honey : we think it will be worth while sending forward some for sale in this market. We do not know exactly what St. Lucia honey would fetch, but for Jamaica honey we can get, and have sold at, 41c. to 43c. per gallon duty paid. These prices you will find to work out more advantageously than the current London and European quotations. Jamaica ships to this market principally in barrels or casks containing about 30 American gallons, that is, about 26 Imperial gallons. For honey in cases, two tins each, perhaps a trifle more money would be paid. Oil tins must be rigidly excluded, and only new containers used. We send you a pro forma account sale for your guidance. Recently some honey in comb was received from Cuba. It carried very well in packages of 24 and 48 sections of 1lb. each. Our broker reports its sale at 55 cents per lb. delivered, and thinks with such good values ruling you might try our market with a shipment in this form giving special care to the packing to ensure safe transit.

Mr. Hudson commenting on the above, says,—I fail to see that it is advantageous to ship to New York in place of London. Forty-two cents per gallon is only equivalent to about 16*s.* per cwt., which price is obtainable in London for medium quality honey. The net proceeds of Messrs. Gillespie's pro forma account sale work out at 35 cents per gallon, or about 13*s.* 3*d.* per cwt., including freight, duty, commission, etc. I cannot help thinking that there must have been something quite exceptional about the Cuban consignment of comb honey that sold at 55c. per lb., as on the same date, according to the market reports published in *Gleanings*, the maximum price realized for Fancy White Comb in all the principal markets of the United States was 16 cents per lb. Still, I am of opinion that it is decidedly worth while making some experimental shipments of comb honey to New York.

Carib Implements. *Nature* for Aug. 28 says :—'There is in *The Reliquary and Illustrated Archaeologist* (Vol. viii., No. 3) a well illustrated article, by Mr. R. Quick, on the Carib stone implements in the Horniman Museum. These implements show the technical skill of the aborigines of the West Indies in working hard rock. Some of the implements are really remarkable examples of stone-work. One example which is figured has a most irregular contour ; from its high finish it was evidently greatly prized, and was probably a symbolic religious object, of which the significance is at present unknown.'

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the **Commissioner, Imperial Department of Agriculture, Barbados.**

It is particularly requested that no letters be addressed to any member of the staff by name. Such a course may entail delay.

Communications should always be written on one side of the paper only. It should be understood that no contributions or specimens will, in any case, be returned.

All application for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 239 of this number.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News

Vol. I. SATURDAY, NOVEMBER 8, 1902. No. 15.

NOTES AND COMMENTS.

Packing for Export.

The Jamaica *Daily Telegraph* for October 18 says:—'The article in the *Agricultural News* on "Packing for Export" is timely and welcome. We sincerely hope that the lessons therein will be taken deeply to heart by our own shippers, especially exporters of citrus fruits.'

Jamaica Fruit in British Markets.

The Agricultural Society of Jamaica has issued a report with the above title, dealing principally with the supply of oranges and pine-apples to the British markets. The pamphlet is essentially practical throughout, and shows clearly that it is only by scrupulous care and attention devoted to the selection, grading, wrapping and packing of their fruit that the orange growers of the South of Europe put their produce on the market in such excellent condition. 'Nothing but the best' Mr. W. B. Gill, the author, suggests as the orange shippers' motto, and he adds, 'not only does this apply to the fruit itself, for many a batch of magnificent fruit has been practically thrown away through worthless packing—but also to the quality of the paper used; the care in wrapping; the neatness in packing; and the damage-resisting qualities of the box.'

Although written principally for Jamaica, this pamphlet is well worth the careful study of all fruit shippers throughout the West Indies.

Instruction in Onion Cultivation.

We drew attention on page 199 to the work being done by Travelling Instructors in the various islands. The following advertisement from the *Montserrat Herald* supplies an instance of such work in actual practice:—

'Recently imported onion seed may be obtained at Grove Station at 3*s.* 6*d.* per lb.

'A trained man will be sent out upon application to give advice and to sow the seed free of cost to the applicants if their land is near either of the Experiment Stations, or upon the payment of the cost of horse-hire if the land is at a distance.'

West Indian Products in England.

On page 226 of this number appears an article by Mr. John R. Jackson, A.L.S., on the recent sales of West Indian drugs and spices in the London market. Mr. Jackson was until recently the Curator of the Museums at the Royal Gardens, Kew. In this position he acquired an intimate acquaintance with many of the vegetable productions of the world. A portion of this knowledge he has placed on permanent record in his *Commercial Botany of the Nineteenth Century*, published in 1890. It is hoped that the present article will be the first of a series, giving a summary of the markets with especial reference to the products of more particular interest in the West Indies.

Selection of Fruit for Export.

Amongst the points we have brought from time to time to the notice of shippers of fruit, are the necessity for good packing, and for careful selection.

In the case of grape-fruit, for instance, it is not sufficient to export any and every grape-fruit, as the following extract from the Circular of Messrs. Gillespie Brothers, for October 17, shows:—'Upwards of 1,500 barrels of grape-fruit have came forward during the last two weeks, some of which have been sold at auction. For genuine fruit of good appearance and large size, favourable prices have been realized, but under this description fell only an inconsiderable portion of the receipts. The bulk consisted of very small fruit, not larger than medium-sized oranges, and offers no attraction to the usual buyers of grape-fruit. Small grape-fruit is perhaps not worth as much money as oranges.'

Banana Cultivation in the Canaries.

Amongst the 'Departmental Reports' in this issue will be found a summary of the condition of the banana trade in the Canary islands. The large profits of the past have, it is said, induced some planters to enter the trade with the recklessness of a gambler, paying as much as £250 per acre for land.

Sweet Potatos in England.

With regard to the shipments of West Indian Sweet potatos to England, the *Gardeners' Chronicle* says. 'It is an extremely difficult matter to persuade people to divest themselves of prejudice in cases of this kind, and of course, the dealers do not care to be burdened with what will not take the fancy of the public. We are therefore the more gratified to find that the first shipments from Barbados have proved satisfactory. Cheap wholesome food is a great desideratum in our European cities, and it seems as if the West Indian islands can do much to furnish a supply at rates profitable to the growers and advantageous to the consumer. Everyone will wish it may be so'.

Stock for Jamaica.

According to *The Times* 'Messrs. Elder Dempster & Co. announce that they are prepared to take out to Jamaica, free of freight, by their Imperial Direct West Indian Line from Bristol, English stallions, bulls and rams for breeding purposes, the importation of which it is believed may prove a great factor in the progress of the island.'

Improving Poultry.

The advice given by Mr. Barclay on page 234 suggests a way to any one to improve their breed of poultry, without any great expense, and without running the risk of introducing varieties of fowls unsuited to their locality. The article is worth the careful attention of all poultry keepers.

The Eruptions in St. Vincent.

In our last issue an account was given of the phenomena experienced at Barbados in connexion with the eruption of the Soufrière of October 15. Beyond the bare telegraphic report no news was then to hand from St. Vincent.

On page 237 of this number we quote some extracts from a Report made to the Administrator of St. Vincent by the local officers of the Department, which indicate clearly the great damage done to the crops and the consequent distress of the unfortunate inhabitants of the devastated area.

The probable temporary abandonment of the arrowroot industry on some of the estates is a serious blow to the welfare of the island.

Improving Indian Corn.

Efforts have been made from time to time to introduce into the West Indies some of the American varieties of corn, bearing heavier crops than those usually cultivated here. These attempts have, in the main, not been successful as the introduced varieties proved to be less hardy than the native corn and more subject to insect attacks. During the past two seasons experiments have been made at Antigua to produce, by cross fertilization, a variety combining the hardy character of the native corn with the heavier yielding qualities of the American varieties. A summary of the experiments will be found on page 229.

Spraying in American Towns.

In New York and other large cities of America, the shade trees planted in the avenues suffer from the attacks of leaf-eating caterpillars and beetles. The leaves are eaten off and the trees, stripped of their foliage, are neither ornamental nor useful. As a remedy spraying with arsenical poisons is resorted to on a large scale. The work is done with a spraying outfit mounted on a cart drawn by a horse. The pump is worked by a gasoline motor, and pumps the liquid into a number of lines of hose which are carried up ladders to reach to the tops of the trees. At the present time, arsenate of lead is used in preference to Paris green, as it resists the rain and remains longer on the leaves. Very good work is done by these machines in the streets of New York and other large cities, and with their help the trees remain green and shady all the summer through.

Insect Specimens.

A small box of insects has been received from Mr. J. W. Campbell of Sion Hill, St. Vincent, through the Curator of the Botanic Station. These included four species new to the collection of this Department, and one species not as yet recorded from St. Vincent. Such specimens are always of interest and value. The different insects of any locality, though not always directly affecting agriculture, have all a bearing on each other, and the mere occurrence of any one species in one locality may throw light on the entomological problems of that locality and may help to explain how and why any particular pest becomes destructive or the reverse.

It is hoped that others will follow Mr. Campbell's example. Specimens are always welcome, and if sent to this Department, they will be incorporated in the collection and will be of great assistance in entomological work in the West Indies.

Anthrax at St. Vincent.

The Government Circular with regard to the regretable outburst of anthrax at St. Vincent is given on page 232. It is essential that all should pay the greatest attention to its directions, and particularly avoid cutting open the skin, or allowing the blood of the diseased animals to escape. Anthrax is due to bacteria which form spores or 'seeds' only when allowed free access to the air. Hence the necessity also for burying the carcases deeply.

INSECT NOTES.

Spraying Sweet Potatos.

The varieties of sweet potato, grown as part of an experiment by the Department at Waterford estate, Barbados, were found to be suffering from the attack of a caterpillar which webs up the leaf and then eats it. The vines were considerably damaged and the condition of the plants was unsatisfactory. The field was sprayed with a mixture of

Paris green	...	...	1 lb.
Lime	...	...	5 lb.
Molasses	...	...	10 lb.
Water	...	...	200 gallons.

This is the usual Paris green mixture with the addition of molasses to enable the poison to adhere to the plants and resist the action of rain. Two machines were used, the 'Knapsack' and the 'Fruitall,' and the work was completed in a little over a half-day, including all preliminaries. The spraying was done on September 19. Live caterpillars were not to be found the week after, and the field has remained healthy for a month after the treatment. The result has thus been very successful.

Spraying such as this should be carried out on every field of sweet potatos in which insect pests appear. The cost, under fifty cents per acre, is so small compared with the value of the crop that, in the majority of cases, the increased yield is far more than enough to pay for the treatment even when the attack is only mild. In bad cases of red spider, potato worm, or other pests, there is often the risk of entire loss of the crop.

ANTHRAX AT ST. VINCENT.

The following 'Important Notice' has been issued by the Government of St. Vincent:—

A disease among cattle has appeared in St. Vincent during the rainy season for some years past, more particularly in the neighbourhood of Mesopotamia Valley, Calder, Brighton, etc., from which many head of stock have perished.

This year the disease has been rather wider spread than usual, and has been extended to the Island of Mustique, in consequence of cattle from St. Vincent having been removed there.

The disease in question is known as Anthrax or Splenic Fever, and in addition to its being very fatal to cattle it is also highly dangerous to human beings who can contract it by handling the dead animals. Several cases of Anthrax have already been treated at the Colonial Hospital.

Animals which are suspected to have died of this disease should on no account be skinned or cut open in any way, but the body, in its skin, should, whenever possible, be carted at once to the sea, or if that is not possible, buried *deep* in the least frequented part of the pasture and away from any water or dwelling house, and lime should be thrown on the body.

The flesh of such animals should never on any account be eaten.

All dung or droppings from suspected sick animals, or animals which have died, should be carefully gathered up and destroyed by fire at some place where other animals do not have access.

Where an animal is seen to be sick with the symptoms of Anthrax, it should be at once separated from the rest of the herd and allowed to die. It should not be cut or bled in any way. The other animals should be moved away at once to another pasture and kept separate, and carefully watched for ten days, when, if they show no signs of sickness, they may be considered healthy.

All sheds, stables and buildings where a diseased animal has died or has been kept, should be cleansed and disinfected as follows:—

Fresh lime should be thoroughly sprinkled about the place, which should then be swept, and all dung, trash, and anything else the animal has been in contact with, should be effectually removed.

The place should then be limewashed, a pint of carbolic acid being used to each gallon of limewash.

Owners of stock are urgently requested to give attention to these precautions.

In consequence of the outbreak of this dangerous disease, telegrams were sent from St. Vincent to the Governors of Barbados, Trinidad, and the Leeward Islands, and to the Administrator of St. Lucia, notifying the occurrence of the disease and advising the prohibition of all importation of stock from St. Vincent for the present.

RICE PRODUCTION IN BRITISH GUIANA.

In the *Agricultural News* (p. 220) attention was called to the steadily decreasing quantity of rice imported into British Guiana consequent on the increased quantity grown locally. The Comptroller of Customs, in his report recently published, referring to rice writes:—

The falling off last year amounted to 5,186,380 lb. In the last twenty years the decrease in the quantity of rice imported has amounted to 65 per cent. Many persons are greatly exercised about the large loss to the revenue from import duty which this decrease represents, but surely there is no need for anxiety on this score. It is not that the inhabitants have ceased to use rice, but that they are supplying their wants from locally grown rice. They are obtaining the article more economically, and they are thereby enabled to supply other needs more readily than hitherto, which fact will, in time, tell in the right direction on the volume of imports. The chances of producing more rice than is necessary by our local needs, and the consequent establishing of an export trade go up year by year. This consummation is to be devoutly wished for and stoutly aimed at.

This is distinctly encouraging, and it is hoped that the people of the neighbouring West Indian islands will endeavour to emulate the people of Demerara in the effort to supply their wants from products grown locally. We have before pointed out that there are many articles of food imported in large quantities by some of these islands which should be grown locally.

WEST INDIAN FISHERIES.

TARPON IN TRINIDAD.

We are indebted to Mr. Sylvester Devenish, late Surveyor-General of Trinidad, for the following very interesting notes on the Tarpon or *Grande Ecaille* as it is known in that Colony:—

Many years ago I was often asked by several of our Governors, to act as their Aide-de-camp, *pro tem*, and organize for some of their friends, either officers of the Garrison, or sporting tourists, or both, a tarpon fishing excursion in the Gulf.

Many a jolly party I have thus had in my American built boat the *Swan*, well stocked for those occasions with all necessary supplies, including a useful 'Norwegian stove,' which, in the bows, quickly and most efficiently did its duty, in cooking or keeping warm our meals for the day.

The tarpon is very common in Trinidad, particularly in a small estuary called 'the blue river,' or (by the Spaniards) '*el caño Salado*,' situated a little over two miles south of the Caroni river. It is about two miles long, with a width varying from 30 to 5 feet, and has at low water a depth of about 3 feet at its entrance and between 2 and 5 fathoms higher up. Here is a favourite resort of the tarpon, which feed on the plentiful supply of small fish brought in by the tide, and on oysters which they easily crack open with their strong, hard, bony jaws. They generally weigh there from 10 to 20lb. but are sometimes of a much greater size. My old friend Mr. E. F. O'C.... our renowned greatest fisherman of days long gone by, once caught a tarpon weighing 105lb. This was the largest I have ever heard of in our waters. As Mr. O'C., was constantly fishing there, day and night, he has been nicknamed 'The Admiral of the blue river' and is certainly the best authority on fish we have in Trinidad.

The habits of the tarpon have been well described by previous correspondents, particularly its facility to rid itself of the hook when the line slackens, owing to the hard bones in the roof of its mouth. We do not use the 'rod' here but 18 thread trawling lines, with hooks Nos. 1 and 2 and 7 fathoms wire Nos. 18 or 19. We found it a great improvement to have a smaller hook and a larger one fastened *back to back*, as with this addition the fish is less able to free himself.

The best bait is young mullets or large sardines and anchovies, but the tarpon is so voracious that it blindly snaps at anything spinning in the water, such as a piece of white cloth or the pith of the Agave, bifurcated at the end in imitation of a fish's tail and commonly used when no better bait is at hand.

One of the most marked peculiarities of this fish is its knack, when hauled almost abreast of the boat, suddenly to leap clean out of the water to a height of 12 to 15 feet, when it often throws off the hook and falls in the water effecting an easy escape to the great disappointment of its would-be catchers. Having lost several in this way, it struck me that we might perhaps find a way of securing the fish, and I suggested that as soon as the tarpon was nearing the boat and preparing to take its flight, we should all of us (generally 4 or 5 exclusive of the boatmen) have ready to our shoulders the short breech-loading carbines, then used in the Artillery, and as soon as the (then flying) fish was at a sufficient height in the air to send it a general volley which would at once bring it down, when with either a boat hook or a harpoon, always kept ready for the purpose, it could be easily secured before it sank, and brought aboard. Owing to the toughness and slipperiness of their scales they should always be shot from the tail upwards. This proved eminently successful and it was really good fun, thus adding shooting to fishing sport. I do not know whether it has ever been tried elsewhere, but if not I would certainly recommend its being tried.

The tarpon when dead emits in the dark a vivid, brilliant, effulgent light visible at several hundred yards. I recollect once, at 'Chacachare,' noticing from my boat at a little distance from the land, on a starry night, an object shining on the shore like a highly polished piece of silver, and on getting near found it to be a dead tarpon about 2 feet long hanging to a fisherman's net-pole. It is a pity the flesh of the tarpon is not more savoury and 'recherché,' as it would greatly add to the pleasure of the fishing.

The scales of the tarpon when it is alive or recently dead are beautiful. They are flat, transparent, of a pure white, fringed all round, with a silvery segment at the root, and delicate pretty designs along their perimeter, not unlike lace, and very pleasant to look at when placed between the eye and the light.

It once occurred to me that they might perhaps be converted into very original and curious visiting cards. I tried some and found that they could easily be written or printed on, but to my great disappointment found that in time they lost their transparency and pure white and silver and warped, although I kept them heavily pressed for several days.

This, of course, greatly discouraged me, but I still believe that if properly treated by a professional card maker, they might be turned into useful things. I am not aware that any attempt has been made to use them in any way, but I believe it is worth trying.

POULTRY.

In the issues of the *Agricultural News* of August 16 and 30, and September 13, Mr. Barclay dealt at length with the various Breeds of Fowls. In the present number he offers practical suggestions for improving common fowls:—

HOW TO IMPROVE COMMON FOWLS.

It is better for beginners,—in which category I include those who have hitherto been content to let their fowls run and breed as they pleased, flinging them a handful of corn once a day, and taking what eggs and chickens they chanced to get,—not to be too ambitious all of a sudden and begin by importing pens of pure-bred fowls, without experience and without aptitude for handling fowls. This would probably end in dire failure. It is often risky, and surely expensive, to do so at first.

Where there are experienced breeders, as there are in some of the islands, (at least there are several in Jamaica) who have been accustomed to import, acclimatize and breed American or British fowls, it is always best to buy eggs for hatching or the young pure-bred birds from them, with which there is no risk.

CROSSING.

But the best, least expensive, and a very sure plan is simply to take the best layers of your common fowls, never minding about the size, for size is more easily got than laying qualities, then purchase a pure-bred cock of the laying breeds suitable to your district, as I have explained. Or, if you intend keeping a large number of fowls, you could also buy a cock of the large breeds and run two roosters, so that some of your chickens would be from a laying, non-sitting breed, and some from a large table breed. But I do not recommend this: it is too haphazard. It is in all cases better to put four or six or up to ten of your best hens, according to the number you keep, in a pen by themselves with the male bird you intend to use. You thus make as sure as possible that the eggs you are setting are fresh eggs and from the selected hens you wish to breed from.

CROSSING FOR LAYERS.

Say you want to rear good laying hens first. You get a brown, buff, black, or white Leghorn cock (the darker varieties to be preferred) and run him with your selected hens; in a fortnight you may set the eggs laid; the chickens when their feathers appear will mostly be the colour of the cock. If well tended the pullets will lay in five or six months, and, being half-bred Leghorns will want to lay thirty to forty eggs before they get broody, for they will likely want to set having half-setting blood in them. Most common hens are rabid setters and do not generally lay more than a dozen eggs before they can go to set. Your young half-bred Leghorn cockerels, you will likely be able to sell among the people around for breeding stock at more than table value, for while it is an axiom only to use pure-bred males, still half-breds are an improvement on the common, scraggy rooster.

AVOID INBREEDING.

Next season, if you are pleased with the results, exchange your rooster for another Leghorn, or sell the old one and purchase a fresh one, as inbreeding is one of the things you must avoid if you wish to have healthy and hardy fowls. It may be that your district is hot and dry and then you may prefer a black Minorca cock. The chickens will all then come black or nearly so.

CROSSING FOR SIZE.

But, perhaps, after the first year you think your fowls too small for your purposes and you would like to have more body on them? You would then get a Plymouth Rock, Orpington, Wyandotte or Indian Game cock, according to your district. Or, if you are troubled by hawks or other birds or beasts of prey, or, if your fowls are not so active as you would like, use an Old English Game cock for one season. Your chickens from these would be of good size, very good layers and have lost any resemblance to the common fowls of all sizes and colours and shapes you started with. In colour and shape they would be nearly uniform, much like the last roosters used. The third year you would go back to one of the laying breeds and your chickens would come of good size and be good layers, probably on the same food as your common hens had, but with some more care exercised in breeding. You would then have fowls one to two pounds on an average heavier and laying double the number of eggs, than when you let the common fowls run and breed as they liked. Or, if you were thoroughly well pleased with any particular breed you would stick to it. The first generation of chickens from the pure-bred cock would be half-breds; the pullets of these, run with a purchased male of the same breed would produce three-quarter-breds, most of them difficult to tell from the pure-bred. Using a pure-bred male again, the next generation would be nine-tenths pure and uniform in every way as the pure-breds—in fact, practically pure-breds.

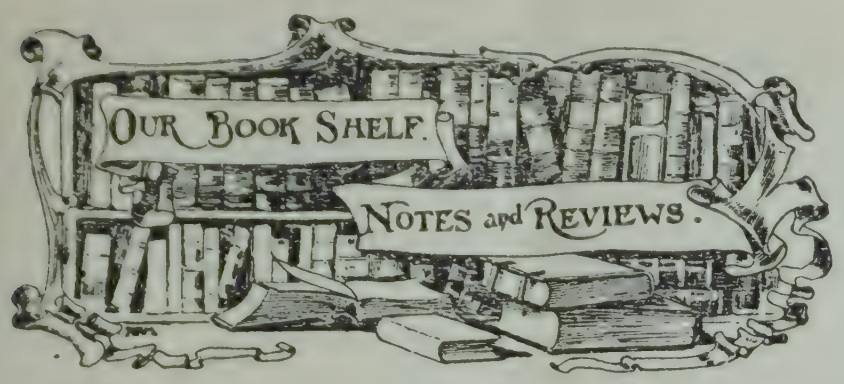
PASTURE TREES.

In his Annual Report on the Royal Botanic Gardens, Trinidad, 1901-02, Mr. Hart writes:—

For over 40 years the trees have been under the care of the Department, but a definite appointment has now been made. Considerable labour was expended on the trees during the past year, in pruning and cleaning and removing dead wood. As the lands are for the most part, grazing grounds for cattle, planting can only be done under good protection, and this is an expensive item in the upkeep. As soon however as one set of trees have grown out of reach of damage by animals, the protectors are at once used for a new set, and during the coming year several blank places will be filled up by young trees. Some of the trees planted during the Superintendent's term of office, have now stems over a foot in diameter. Over fifty trees have been established during recent years, while not more than three or four have had to be removed.

Lectures to Teachers at Barbados.

The first of the series of Lectures to the Teachers of the Elementary Schools of Barbados at the St. Philip's Centre, on the Manner and Method of Teaching the Principles of Agriculture by means of Object Lessons, was delivered at the St. Philip's Church Schoolroom on Saturday, November 1st, by Dr. Longfield Smith. Sixteen teachers attended. The lecture like those delivered at the other Centres of the island was illustrated by numerous simple experiments which could be easily performed by any teacher. At the close of the lecture cyclostyle notes were distributed.



GROWING SUMATRA TOBACCO UNDER SHADE. By Milton Whitney, *U. S. Department of Agriculture, Bureau of Soils. Bulletin No. 20, 1902.*

This bulletin gives an account of the experiments that have been carried on in the Connecticut Valley with a view to improving the quality of the Connecticut tobacco leaf. This leaf is used for cigar wrappers but is much inferior for that purpose to the imported Sumatra leaf. The experiments have been carried on in a number of different soils, the total area under shade being 41 acres. A fine quality of leaf has been obtained at a cost of 47·6 cents. per pound, excluding any charge for land, buildings or insurance, or interest on the money invested. Owing to the large outlay of time and money, which is necessary, it is not recommended that costly experiments should be attempted in areas where 'the soil survey has not indicated at least a reasonable chance of success.'

NATURE STUDY AND LIFE. By Clifton F. Hodge, Ph. D. *Messrs. Ginn & Company, Boston, U.S.A., and London. 1902.*

This book is intended for the use of teachers who are taking up nature study in their schools. The methods put forward have been tried for years in the public school gardens at Worcester, Mass.

The author's purpose throughout is to develop in the children a love for, and an intelligent interest in, the living beings, animals and plants, with which they are continually coming into contact.

The study of plant life, as here put forward, may be divided into three parts. The first deals with the study of wild flowers. The children are taught to hunt for and to recognize the commoner or more interesting wild flowers. The second and largest part treats of the plants of the garden and their cultivation. The actual plants used must needs vary with the locality, but the methods will be the same and the author's hints should prove of great value to teachers. The account of budding, layering, grafting, etc., is very good. The chapters on elementary forestry are full of information and show the great importance of the subject.

The third part deals with flowerless plants. This part is necessarily very incomplete. There is a fairly full account of edible and poisonous mushrooms, and short descriptions of some of the most important fungoid diseases and their treatment. In writing of bacteria the author shows how the necessity for scrupulous cleanliness may be impressed on children by one or two experiments, and gives simple and clear reasons for the precautions that have to be taken to avoid the spread of infectious diseases.

The study of animal life occupies a large part of the book. Insects, destructive, beneficial and beautiful, form the subject of these chapters, and the parts dealing with aphides, scale insects, and the honey bee are especially applicable to these Colonies. A chapter on the common toad is full of interest and should be read in every school in the West Indies, whilst the remainder dealing with frogs, birds and miscellaneous animals, though not closely applicable to West Indian fauna, could be read and applied by an intelligent teacher.

The purpose of the book throughout is excellent, and the interest in nature it is likely to produce, would be most valuable, if even only in part aroused in the minds of the teachers of all grades of schools.

This book can be commended to libraries throughout these Colonies, and to everyone who has a desire for nature knowledge and a glimpse of the ways of the beasts, birds and flowers that are to be found.

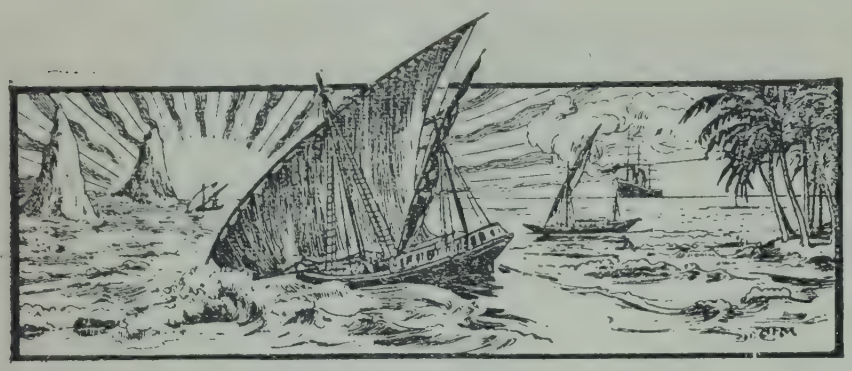
PICTORIAL PRACTICAL GARDENING,
PICTORIAL PRACTICAL FRUIT GROWING.
PICTORIAL GREENHOUSE MANAGEMENT.
By Walter P. Wright. *Messrs. Cassell & Co., London.* Price 1*s.* each.

These small books are intended primarily for the use of English horticulturists, consequently a large part of the information given is not specially adapted to the West Indies. The general directions however, should prove of value to gardeners and fruit growers everwhere, such as the directions for striking cuttings, grafting, budding, pruning, gathering and storing fruit, etc.: also the accounts of soils and manures, the preparation and application of insecticides, and fungicides, etc. The directions are short, clear and very practical. The illustrations are very numerous and useful.

METHODS OF PROPAGATING THE ORANGE AND OTHER CITRUS FRUITS. By Herbert J. Webber. *U.S. Department of Agriculture.*

This pamphlet is a reprint from the Year-book of the Department of Agriculture. It gives descriptions of the principal methods of propagation employed by citrus nurserymen and growers in Florida, including the raising of seedlings, the seed bed, the use of cuttings, the nursery stocks, budding, grafting and inarching. A number of plates are given illustrating the chief points. The pamphlet should be useful to growers of oranges, etc., in the West Indies.

Pyrethrum and Mosquitoes. Most people, especially new comers to the tropics, object to being bitten by mosquitoes and find that a mosquito net is not always a fully satisfactory protection. To these we would recommend the pyrethrum powder which forms the chief ingredient of many insect powders. If a few spoonfuls of this powder are placed on a tin lid and a lighted match is applied, the powder will slowly smoulder, giving off a light smoke which is peculiarly obnoxious to mosquitoes. The odour is not unpleasant and is entirely harmless to human beings, whilst a room thus fumigated in the evening will probably be found to be free from mosquitoes. During the rainy season mosquitoes sometimes gather in hundreds in a room, apparently for social amusement and dancing. These assemblies are easily dispersed with a little pyrethrum powder, and susceptible persons may thus rid themselves of the mosquito nuisance. As ordinary insect powder frequently contains a variety of substances, it is advisable to procure 'Pyrethrum,' sold in one pound tins by Messrs. C. F. Harrison and Co., and Messrs. G. W. Hutchinson and Co., Barbados, at 60 cents per pound.



GLEANINGS.

Another experiment with onion growing from seed is about to be carried out at the Botanic Station, Tobago. It is hoped that this will be as successful as the previous one.

Seeds of the well known bee plant, the Christmas Wreath (*Ipomea sidaefolia*), were received at the Tobago Botanic Station in February. The plants grown therefrom are now in flower and the native bees are actively gathering honey.

During the early part of October hot and dry weather prevailed in Demerara. A few heavy showers would be beneficial to the growing canes.

The *Monthly Weather Review* reports that the eruption of Mont Pelée appears to have been heard at Maracaibo, Venezuela, no less than 830 miles from Martinique.

The Royal Agricultural and Commercial Society of British Guiana have decided to ask the Government to import 20,000 or 30,000 banana suckers for distribution among the farmers of the Colony, either free or at a nominal cost.

Dr Evans, the Curator of the British Guiana Museum is proceeding to the Pomeroon to investigate a plague of beetles prevalent in the district.

Grape vines, trained over an arbour, are used to shelter the bee hives at the Antigua Botanic Station.

During the last season the Antigua Station distributed over 5,000 seedling limes.

From British Guiana, we learn that the canes due for reaping up to the New Year are arrowing freely. The December canes continue to grow rapidly but they are beginning to ripen up, and growth will soon be at a stand still. May and June canes have grown well and have a vigorous, healthy appearance.

The Curator reports that the rainfall recorded at the Botanic Station, Tobago, for the month of September was above the average, being 13·11 inches.

Several imported cattle and fowls have been introduced in Tobago with the object of improving the present stock.

A report by the Hon'ble Francis Watts on the Soils of Dominica is in the press and will shortly be issued.

The *ad valorem* Import duties at Barbados have been raised from 10 to 12 per cent.

The monthly summary issued by the U.S. Weather Bureau at Barbados gives the total rainfall for September as 2·01 inches.

It is proposed to hold the next Agricultural Exhibition at Dominica in February.

The Annual Barbados Industrial Exhibition will be held in December.

The cotton industry is being taken up in Montserrat and several people are planting seed.

Spraying on lime estates is being adopted in St. Lucia and the Agricultural Instructor is importing some dozen machines for planters. Arrangements have also been made with Mr. Hull, of Castries, to keep a stock of insecticides for sale.

Four acres of cotton are now under cultivation at St. Lucia Experiment Station.

The Choiseul and Soufrière Agricultural Societies at St. Lucia are doing useful work, including the importation of pure-bred stock and the formation of village libraries of Agricultural literature.

Rum is now almost unsaleable in British Guiana. A large reduction in output would seem to be the only remedy for the overstocked condition of the rum market.

Sales of 99° crystals have been made at $\$1.77\frac{1}{2}$ per 100lb. in Demerara : the market appears fairly firm.

All estates in British Guiana are now busy making sugar. The juice is of good quality, polarizing from 1·40 to 1·60 lb. cane sugar per gallon, with a high quotient of purity. Yield varies from $1\frac{1}{4}$ to $2\frac{1}{2}$ tons per acre. The yield on the West Coast of Demerara and in Essequibo is regarded as disappointing

Vanilla vines have flowered and borne pods of good length in some private gardens in St John's, Antigua.

The Loquat fruited at Antigua for the first time in March of this year. The fruits although small were of good flavour.

The Sicily lemon has borne good-shaped, juicy fruit at the Antigua Botanic Gardens and appears worthy of more extended cultivation in the island.

There is a great demand for cacao plants at Tobago, owing to the cultivation of this plant rapidly extending in various parts of the island.

In the drier districts of Barbados the ratoons are suffering very much from the recent drought. Some fields look as if they would not yield half a hogshead of sugar to the acre.

Oranges grow in Jamaica from the sea level up to about 4,000 feet.

CANARY ISLANDS: TRADE OF FOR 1901. Diplomatic and Consular Reports. Foreign Office, July, 1901.

The export trade was larger than in 1900, but it is noted that it remains to be seen whether this improvement will be maintained, or whether it will fall away under such influence as competition from the West Indies.

The imports of sugar have fallen to 28 tons (1899, 184 tons, 1900, 112 tons), this is owing to the increased local production especially in Grand Canary, of sugar-cane and to the new tariff.

The number of bunches of bananas exported was 266,700 (204,917 in 1900) and the value (the price obtained by the farmers) £33,337 (£20,490 in 1900). The fruit is said to have been not at all first-class. It is noted that the value of the banana has actually increased in spite of the Jamaica imports into the United Kingdom, but it is not expected that the price paid can be maintained much longer. Land has acquired great value, partly owing to the belief among farmers and shippers that Jamaica bananas have turned out a failure: and that they are inferior in quality to the Canary bananas. A crisis is foreseen in the event of the prices of the fruit becoming lower, because many people have borrowed largely for the purpose of acquiring land at very high prices, as much as £250 per acre.

The potato crop was small owing to the prevalence of disease. The onion crop was, on the whole, an absolute failure; much less land was planted with onions in Teneriffe and the crop in Lanzarote failed owing to lack of rain.

VOLCANIC ERUPTION AT ST. VINCENT.

DAMAGE DONE TO CROPS.

Mr. H. Powell, Curator of the Botanic Station at St. Vincent, and Mr. Thomas Osment the Agricultural Instructor have made a report to the Administrator of the island on the damage done by the eruption of the 15th ultimo. 'The damage done to the crops in general over a large area of the windward coast is severe, and in consequence, the agricultural outlook at the present time is gloomy in the extreme.' The report is too long to be reproduced in full in these pages, but the following extracts will serve to convey some idea of the condition of the crops, etc., of the unfortunate dwellers in the devastated part of the island:—

'At Kingstown the depth of sand was from $\frac{1}{8}$ to $\frac{1}{4}$ of an inch. This gradually increased in thickness right on to Georgetown, and at Mount Bentic, the new deposit averaged 6 inches in depth.

'At Hopewell and the upper part of the Mesopotamia valley the "wail" of the people, as at other places, was that their provisions were being burnt up. This was in a sense indeed true, more particularly so where the sand was a couple of inches deep. The day was very hot, and as no rain had fallen (of any consequence) during or since the eruption, the sand had been so acted on by the sun as to be almost roasting hot. . . The prostrate canes can be made into syrup, and the people were advised to attend to this without delay. In several localities the allottees had planted large plots of various provisions after the damage done to the permanent crops in May. These provision crops have now been destroyed and their loss has made the people very despondent. The fine cacao cultivation at Mount William has received further damage. The branches of numerous trees were bent downward, and hardly a flower was noticed. The cacao season has commenced, but not a single pod was seen on any of the trees so serious was the damage of May 7.

'On some of the arrowroot estates the difficulty which has arisen in regard to the water supply will probably result in the abandonment of the manufacture, for a year or so.'

DEPARTMENT NEWS.

Dr. D. Morris, the Commissioner of Agriculture for the West Indies was due to leave Halifax on the 3rd. instant and is expected to reach St. Kitt's on the 11th.

The third part of Vol. III of the *West Indian Bulletin* has been published, and may be obtained from the usual agents of the Department (Price 6*d.* post free 8*d.*) Amongst its contents is a paper suggesting the manufacture of sugar in the West Indies for brewery purposes. Articles on Object lessons and School Gardens, illustrated by figures, indicate exactly what is being done in some English Schools. Suggestions are also made to render the courses of practical value under West Indian conditions. In addition to three short articles on entomological subjects, a complete descriptive list is given of the known West Indian scale insects. The number concludes with a resumé of the recent volcanic phenomena in the West Indies.

Pamphlet No. 19 of the Department Series has been issued entitled *Seedling and Other Canes, Barbados, 1902.* It contains a summary of the results of the sugar-cane experiments which have been carried on in Barbados during the past season under the direction of the Department. The more detailed results will appear, as usual, in the large Annual Report, now passing through the press. The pamphlet can be obtained from the local agents of the Department. Price 4*d.* Post free 5*d.*

A summary of the sugar-cane experiments in the Leeward Islands conducted by the Department during the past season forms Pamphlet No. 20, (*Seedling and Other Canes in the Leeward Islands, 1901-02*) of the same series. (Price 2*d.* Post free $2\frac{1}{2}$*d.*) Its contents are similar in character to those of the Barbados pamphlet, the object in each case being to put an accurate summary of the experiments in the hands of the planters at an earlier date than it is possible to publish the larger Reports, which take a considerable time after completion, in merely passing through the press.

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—Oct. 14, 1902.—Messrs. J. Hales Caird & Co., Messrs. Gillespie Bros. & Co. and 'The Public Ledger,' Oct. 4, 1902.

Aloes—Curaçoa, 10/- to 40/-; Barbados 13/- to 35/- per cwt.
Arrowroot—St. Vincent, 3*d.* to 3½*d.* per lb.
Balata—Venezuelan, 2/- to 2/5½ per lb.
Bees-wax—Jamaica, fair reddish to pale £7 5*s.* to £7 15*s.* per cwt.
Cacao—T'dad, 60/- to 85/- per cwt. Dominica 56/- to 57/- per cwt. Grenada, ordinary to fine 56/- to 63/- per cwt. Jamaica, 54/- to 63/6 per cwt.
Cardamoms—Mysore, 1/- to 3/- per lb.
Cassia Fistula—5/6 to 35/- per cwt.
Coffee—Jamaica, 30/- to 125/- per cwt. Costa Rica, 42/- to 99/- per cwt. Peaberry 75/- to 115/- per cwt.
Cotton—West Indian $4\frac{13}{16}$ to $5\frac{3}{8}$*d.* per lb.
Fustic—£3 10*s.* to £4 5*s.* per ton.
Ginger—Jamaica, common to fine 35/6 to 50/- per cwt.
Honey—Jamaica 14/- to 22/6 per cwt.
Jalap—3*d.* to 5½*d.* per lb.
Khus-Khus Root—12/- per cwt.
Kola Nuts—1*d.* to 4*d.* per lb.
Lime Juice—Raw, 1/- to 1/2 per gallon; concentrated, £11 10*s.* per pipe.
Logwood—Jamaica, £4 2*s.* 6*d.* to £4 7*s.* 6*d.* per ton.
Mace—1/3 to 2/10 per lb.
Nitrate of Soda—Agricultural £8 15*s.* per ton.
Nutmegs—90's to 60's @ 1/1 to 2/7, 132's to 95's @ 7*d.* to 1*s.* per lb.
Pimento—2½*d.* to 3*d.* per lb.
Sarsaparilla—Jamaica fair 8*d.* to 1*s.* 4*d.* per lb.
Sugar—Muscovado, 11/6 to 13/6 duty paid; crystallized 12/6 to 15/- per cwt.
Sulphate of Ammonia—£12 per ton.
Tamarinds—Barbados 12/- to 15/6 per cwt.
Tonquin Beans—1/- to 2/6 per lb.
Fruit—Covent Garden Market ('Gardeners' Chronicle,' October 9, 1902.)
Bananas—6/- to 10/- per bunch.
Oranges—13/6 to 23/- per case.
Pines—3/- to 5/- each.

Halifax N.S.—'The Maritime Merchant', Oct. 9, 1902.

Molasses—Barbados 24c. to 25c. Porto Rico 30c. to 33c. per gallon.
Oranges—Jamaica, $3.50 to $4.00 per box.
Sugars—Bright yellow, $3.70; No. 1 yellow, $3 40.

New York,—October 17, 1902.—Messrs. Gillespie Bros. & Co.

Cacao—African, 13¼c. to 13⅜c.; Caracas, 13¾c. to 14¼c.; Jamaica, no stock: fair ordinary, 11½c., good fermented 12c. to 12½c.; Grenada, no stock; 13½c.; Trinidad 13c. to 14½c. per lb.
Cocoa-nuts—Small Trinidads no demand; $11.00 to $12.00; Jamaicas $22.00 to $24.00 per M.
Coffee—Rio, good ordinary 5⅝c. to 5¾c.; Jamaica good ordinary 6c. to 7c. per lb.; Manchester grades 8¾c. to 11c. per lb.
Grape Fruit—$5.00 to $10.00 per barrel.
Oranges—$3.50 to $4.25 per barrel.
Pimento—4½ to 4¾c. per lb.
Rubber—Nicaragua scrap 53½c. to 54c. per lb; sheet 46c. to 47c. per lb.; Guayaquil strip 51c. to 51½c. per lb.
Sugar—Muscovado, 89°, 3c. per lb.; Centrifugals, 96°, 3½c.; molasses, 89°, 2¾c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—October 22, 1902.—Messrs. G. W. Bennett Bryson & Co., Ltd.

Molasses—10c. per imperial gallon, package included.
Sugar—Muscovado $1.32½ per 100lb.

Barbados,—October 25, 1902.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—good quality, $4.00 per 100 lb.
Cacao—$14.00 per 100 lb. Wanted.
Coffee—Jamaica and ordinary Rio $8.00 to $9.00 per 100 lb. respectively.
Hay—New Brunswick $1.00 per 100 lb.
Manures—Nitrate of Soda $60.00 to $65.00; Ohlendorff's Dissolved Guano; $60.00; Sulphate of Ammonia $75.00 to $80.00; Sulphate of Potash $70.00 per ton.
Molasses—No quotations.
Onions—Madeira $1.80 to $2.11 per 100 lb.
Potatos—$1.60 to $1.80 per 160 lb.
Rice—Ballam $4.60 per bag (190 lb.); Patna $3.75 per bag (190 lb.); Rangoon $3.00 per bag (190 lb.)
Sugar—$2.40 per 100 lb.

British Guiana,—October 23, 1902.—Messrs. Weiting & Richter.

Arrowroot—$9.00 to $9.50 per barrel.
Cacao—native 11c. to 13c. sales.
Cassava Starch—$8.00 sales.
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica 11c. to 11½c. per lb. (retail.)—Creole, 11c. to 12c. per lb.
Eddoes—$1.92 per barrel.
Onions—Retail 3c. to 3½c. Garlic 8c. per lb.
Pea Nuts—Curaçoa 3¾c.; American 5c. (retail.)
Plantains—16c. to 36c. per bunch.
Potatos English—$2.75 per barrel.
Rice—Ballam $4.75 to $4.80, ex store; Patna $5.80, to $5.90 per bag. Seeta $5.80 to $5.90—Creole Rice 20c. per gallon, (retail.)
Sweet Potatos—Barbados $1.44, Creole $1.20 per barrel.
Tannias—$1.92 per bag.
Yams—$2.40 per bag.
Molasses—Vacuum Pan, yellow, 15c. per gallon, casks included.
Sugar—White $3.50 to $4.00; Dark Crystals $1.70⅝ to $1.80½; yellow $2.10 to $2.25.; Molasses—$1.40 to $1.60 (nominal) per cwt.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—October 23, 1902.—Messrs. Gordon, Grant & Co., and Messrs. Edgar Tripp & Co. October 24, 1902.

Cacao—Ordinary to good red $12.75 to $13.00; estates, $13.25 to $13.50 per Fanega.
Balata—Venezuelan 42¼c. to 43c. per lb.
Coffee—Venezuelan 6½c. per lb.
Onions—$2.25 per 100 lb.
Potatos English—90c. to $1.56 per 100lb.
Rice—Yellow $4.55 to $4.75; White Table $5.25 to $5.75 per bag.
Sugar—For Grocery use, $1.60 to $3.00 per 100lb.

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PAMPHLET SERIES.

The Pamphlets are written in a simple and popular manner and the information contained in them is especially adapted to West Indian conditions. They contain amongst other subjects, summaries of the results of the experiment work on sugar-cane and manures, the full official reports of which have only a limited circulation. The following list gives particulars of all the pamphlets which are still available. The missing numbers are out of print and can no longer be supplied :—

(3) Seedling and other Canes, at Barbados 1900. Price 2d. Post free, 2½*d*.
(5) General Treatment of Insect Pests, 2nd Edition Revised. Price 4*d*. Post free, 4½*d*.
(6) Recipes for cooking Sweet Potatos. Price 2*d*. Post free, 2½*d*.
(7) Scale Insects of the Lesser Antilles. Price 4*d*. Post free, 5*d*.
(8) Cultivation of Vegetables in Barbados. Price 2*d*. Post free, 2½*d*.
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'NATURE TEACHING.'

A text-book based upon the general principles of Agriculture for the use of schools, prepared by the Honourable Francis Watts and others. (Pages XII and 199) The Plant, the Soil, Plant food and Manures, Weeds, and Insects are successively treated, and the information given is illustrated throughout by simple experiments which can readily be carried out in an ordinary school. The Book is mainly intended for the use of Teachers. Price, limp cloth 2*s*., or in a superior style of binding 2*s*. 6*d*. Postage in either binding, 3½*d*. extra.

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The **'Agricultural News'** is printed in time to be distributed, regularly, by each mail, and is on sale by the local agents of the Department at one penny per number, post free, 1½*d*. The subscription price, including postage, is 1*s*. 7½*d*. per half-year, or 3*s*. 3*d*. per annum. *All applications for copies are to be addressed to the Agents, not to the Department.*

Agents.

The following have been appointed agents for the sale of the publications of the Department :—

London: Messrs. Dulau & Co., 37, Soho Square, W. *Barbados:* Messrs. Bowen & Sons, Bridgetown. *Jamaica:* The Educational Supply Company, 16 King St., Kingston. *British Guiana:* 'Daily Chronicle' Office, Georgetown. *Trinidad:* Messrs. Munro & Co., Frederick St., Port-of-Spain. *Tobago:* Mr. C. L. Plagemann, Scarborough. *Grenada:* Messrs. F. Marrast & Co., 'The Stores,' St. George. *St. Vincent:* Mr W. C. D. Proudfoot, Kingstown. *St. Lucia:* Mr. R. G. McHugh, Castries. *Dominica:* Messrs. C. F. Duverney & Co., Market St., Roseau. *Montserrat:* Mr. W. Llewellyn Wall, Plymouth. *Antigua:* Mr. F. Forrest, St. John's. *St. Kitts:* Messrs. S. L. Horsford & Co., Basseterre.

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Transactions to December 31, 1901.

Total Assurances Issued	$11,813,382
Total Bonuses Declared (31 December 1900)...	3,610,921
Sums Assured and Bonuses Existing	5,060,468
Total Claims by Death and Matured Endowments	5,451,158
Life Assurance Fund	2,143,840
Annual Income	257,983
Net Surplus December (31 1900)	297,124

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May 22, 1902.

H. J. INNISS,
Secretary.

[16.]

Printed at Office of *Agricultural Reporter*, 4, High Street, Bridgetown, Barbados.

AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

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The Growth of a New Industry.

IN the article on the 'Utilization of Home Products' in the last number of this Journal, we pointed out that one of the methods of remedying the present non-economical state of affairs in the West Indies was by the local production of articles now imported. A review of the progress made by one industry, which has been steadily advancing during the last few years, will serve to show that the advice given is not merely theoretical but is capable of practical application.

Some twelve years ago there were probably no onions, to speak of, grown in the West Indies. Large supplies were consumed, and for these the colonies were dependent on importations. The profits arising from the cultivation of these onions went, not to West Indian agriculturists but to the onion growers of the Canary Islands, Bermuda, etc.

In about 1890 an old Bermuda grower, resident in Antigua, put his practical knowledge to account and made an experiment in onion cultivation. The attempt was successful, and by 1896 he had ten acres under onion cultivation in the island. (See *West Indian Bulletin*, Vol. II., p. 163). The question had meanwhile been vigorously taken up by the Botanic Station, and in 1895 to '96, onion cultivation may be said to have attained the rank of a minor industry in Antigua. It has thriven year by year, and its present position may be gauged by the fact that last year, in addition to the large quantities consumed locally, Antigua was able to export over 27,000 lb. of onions to the intercolonial and New York markets.

The industry has also been attempted in other islands, where with the advantage of the valuable experience gained at Antigua, progress has naturally been more rapid. In Dominica experiments in growing onions from sets, imported by the Botanic Station, were made in 1899. The results proved that the conditions

were suitable, and the experiments were repeated in 1900. One or two crates were exported, and gained a good report at New York. Last year both seeds and sets were imported, and the onions exported from the Agricultural School and the Botanic Station to New York were reported as being equal to any from Bermuda and Cuba. Montserrat has not been behindhand in endeavouring to found a new industry. The first efforts were made at the Experiment Stations, in 1900-01, and the cultivation has progressed so rapidly that last year Montserrat exported no less than 3,410 lb. of onions to various parts of the West Indies, and 450 lb. to New York.

In the growth of this comparatively small industry we have an excellent example of progress in the right direction. The imports of onions into the various colonies are large, and are still mainly obtained from outside sources. In 1900 Barbados imported onions to the value of £1,187, Grenada £737, British Guiana £2,833, St. Vincent £145.

It has been conclusively shown that onions of excellent quality can be grown at Antigua, Montserrat and Dominica. Experiments are about to be made in other islands, and we trust that within a few years the West Indies will not only grow onions in sufficient quantity for local consumption, but also to maintain a valuable export trade with the United States and elsewhere.

SUGAR INDUSTRY.

THE SUGAR-CANE CROPS OF THE WORLD.

The following table, taken from the Year-book of the United States Department of Agriculture shows the comparative yield of sugar in the cane-growing countries of the world for 1901-02. The figures given are in tons of 2,240 lb.:—

United States:—	
Louisiana	275,000
Porto Rico	100,000
Hawaiian Islands ...	310,000
Cuba, (crop)	800,000
British West Indies:—	
Trinidad, (exports) ...	50,000
Barbados, (exports) ...	60,000
Jamaica	30,000
Antigua and St. Kitt's ...	25,000
French West Indies:—	
Martinique, (exports) ...	32,000
Guadeloupe	35,000
St. Croix	13,000
Haiti and San Domingo ...	45,000
Lesser Antilles (not named above)	8,000
Mexico	100,000
Central America:—	
Guatemala	9,000
San Salvador	5,000
Nicaragua	3,500
Costa Rica	1,500
South America:—	
British Guiana (Demerara), (exports)	95,000
Dutch Guiana (Surinam) ...	6,000
Venezuela	3,000
Peru, (exports) ...	105,000
Argentine Republic ...	115,000
Brazil	215,000
Total in America ...	2,441,000
Asia:—	
British India, (exports) ...	15,000
Siam	7,000
Java, (crop)	767,130
Philippine Islands, (exports)	70,000
Total in Asia ...	859,130
Australia and Polynesia:—	
Queensland	113,500
New South Wales ..	18,000
Fiji Islands, (exports) ...	30,000
Total Australia and Polynesia	161,500
Africa:—	
Egypt	95,000
Mauritius	150,000
Reunion	35,000
Total in Africa ...	280,000
Europe:—	
Spain	33,000
Total cane sugar production (Willet and Gray)	3,774,630

The total beet sugar produced in the world for the same year was 6,988,126 tons.

COFFEE AND CACAO.

DISEASES AND GRAFTING.

This valuable pamphlet contains the experiences of Mons. A. J. Thierry in Martinique in grafting Arabian coffee on Liberian—a process which has been most useful in preventing the nematode worm disease of the roots of Arabian coffee. * M. Thierry also succeeded in grafting cacao.

DISEASES OF ARABIAN COFFEE.

Root disease: Caused by nematode worms which destroy

* *Notes sur le greffage du Caféier du Cacaoyer et du Muscadier et la Maladie Vermiculaire du Caféier. par.* A. J. Thierry. *Extrait du Bulletin agricole de la Martinique.* 1899.

the young portions of the coffee roots. The disease attacks plants of all ages, even those in the nursery being affected. The best curative treatment is carbon bisulphide. The disease, however, may be prevented by grafting Arabian coffee on Liberian, which latter is not attacked by nematodes. This procedure is recommended in establishing new plantations and when replacing diseased trees.

Leaf disease or rust: It appears to be caused by the leaf-mining larvae of a small moth *(Cemiostoma coffeella.)*

Apart from the use of lights the author considers the remedies suggested for this pest more ingenious than practical. He found that in the case of Arabian coffee grafted on Liberian only the older leaves were attacked.

Collar rot: A disease in which the bark of the collar decays. Its precise nature does not seem to be understood.

LIBERIAN COFFEE IN MARTINIQUE.

In discussing the possibility of the hybridization of Arabian and Liberian coffee, so as to produce a superior variety combining the vigour and disease resistance of Liberian with the fineness and perfume of the Arabian berry, the author points out that the planter has neither the time nor the means to carry out this work to its logical conclusion, but that such investigations should be carried on at Experiment gardens supported either by the planters or the State. Since Arabian can be grafted on Liberian coffee: it is a mistake to plant the latter for fruit purposes.

In Java, thanks to the labours of van Riemsdyck, a hybrid between Liberian and Arabian has been produced which is grafted on Liberian stocks. On one estate there are as many as 53,000 of these grafted hybrid trees. This hybrid is said to be resistant to *Hemileia*, the coffee leaf disease.

THE GRAFTING OF COFFEE.

Grafting by approach: The Liberian seeds are sown four to six weeks before the Arabian as the former take longer to germinate. On the development of the first two permanent leaves, the seedlings are raised and grafted by approach as follows :—A portion of the tender stem of each along with a cotyledon is cut off, the two plants bound together, planted in a bamboo pot and put in a shady place. In three weeks the graft takes, and in five weeks, if growth is satisfactory, the Liberian shoot is cut off as close as possible and the ligature removed. The Arabian graft has now two root systems and grows rapidly. Six months after sowing the seeds, the plants are ready to set out in the open when the Arabian stem can be cut off. The advantages of grafting in the seedling stage in the manner above are that, at this period, the tissues unite readily, and the Liberian root being grafted below the cotyledons cannot send out gormandisers.

Grafting by slips: This method is used in grafting hybrids which cannot be grown from seeds, and where grafting by approach cannot be used.

As carried out in the plantation of Klein-Gitas in Java when a hybrid is grafted on Liberian, the following process is used. The Liberian plants are about a year old and the scion is taken from the extremity of a branch of the hybrid and bears three whorls of leaves. After grafting, the lower leaves of the graft are renewed and the plants transplanted into ditches filled with river sand, well watered and covered with a glass roof for three days. For the next three weeks the glass roof is partly opened. At this point the grafts which are not languishing are replanted in a nursery, or, if the season is favourable, in the open.

BUDDING.

Young plants in bamboo pots having only one pair of permanent leaves were budded by inserting the bud under the bark in the axils of the cotyledons.

GRAFTING CACAO.

As the cacao tree does not reproduce itself exactly from seed and varies in bearing power, the utility of grafting any special tree is therefore apparent. Only where any special variety comes true from seeds can seedlings be grafted in the manner adopted in the case of Liberian and Arabian coffee. The scions are selected from the extremities of branches where the wood has not yet hardened, and are grafted on seedling stocks in bamboo pots in which the first permanent leaves have appeared. When the grafts have taken and growth has commenced, the plants are gradually hardened off for planting in the open air.

COLLECTING AND FORWARDING FUNGOID SPECIMENS.

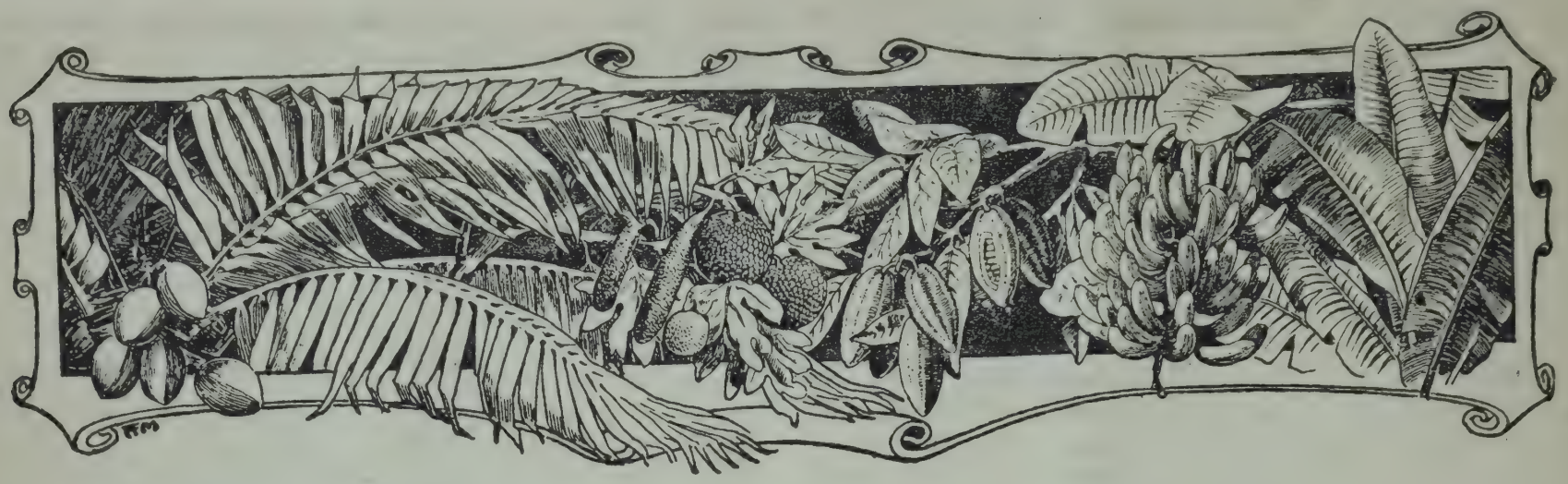
Specimens of plants attacked by fungoid diseases may be forwarded for examination through the Curator of the Botanic Station or any officer of the Department of Agriculture. In order that the specimens may reach Barbados in the best possible condition, some care is necessary in their collection and packing. Unless this is taken, much time and labour are often wasted in the examination of unsuitable material.

When specimens of moist vegetable matter are packed in boxes or sent in envelopes they speedily become covered with saprophytic growths which frequently obscure all traces of the original cause of disease and render the specimens worthless. This is especially the case when the material has been collected some days before the closing of the mails for Barbados.

Fresh specimens of diseased plants should either be suitably dried and sent in a well-ventilated package or, preferably, placed in meythlated spirits, high wines or rum immediately after collection and forwarded in a bottle or corked tube. When leaves, buds or twigs are attacked, the specimens should show as many stages of the disease as possible. When fruits, stems or roots are attacked, diseased pieces showing all stages should be cut out and placed in spirit as before.

Specimens of bark, wood and large fungus fructifications which are dry should be wrapped in soft paper and sent in a well-ventilated package. If they are not dry they should be placed in the sun and sent as above. When it is considered desirable to send very large specimens such as portions of branches, stems, roots of trees or whole cacao pods, these should be collected as late as possible before the mail steamer leaves, and sent in a well-ventilated case.

Full notes should be sent giving details of the time of appearance of the disease, the locality, the damage done, the part attacked and also the date when the specimens were collected.



WEST INDIAN FRUIT.

PACKING ORANGES.

On page 230 of this Journal we drew attention to the pamphlet by Mr. W. B. Gill on *Jamaica Fruit in British Markets.* The following extracts on the method of packing Valencia oranges should be of value to all orange shippers in the West Indies. Throughout will be seen the cardinal importance of paying careful attention to all details however trivial and unimportant they may seem :—

These are invariably shipped in three standard sizes—420's, 714's and 1,064's. The boxes in which these quantities are packed, are each of about the same dimensions, but much larger than the American style of box used in Jamaica. The Valencia box instead of one partition has two, thus giving three compartments. It is longer and broader and deeper than the American box, and is made out of whitish wood. Its slats are thin and run the whole length of the box, but have wide openings between each slat, in each of the four sides of the box. In addition to the usual nailing, each box is strapped once lengthways and twice at each end, often three times crossways, with a strong flat rope, half an inch wide and evidently made out of some kind of grass grown in Spain. It is doubtful if this rope can be supplied cheaper than the usual willow straps such as are used by the American shippers, but at all events it goes to prove that no labour or expense is considered too great to ensure the boxes arriving at their destination in a perfectly sound condition.

Too much attention cannot be paid to these sorts of things. It is the little things that count. I have seen fruit put on board steamers at Kingston in condensed milk boxes ; yes, and even in cases in which tins of kerosene had previously been shipped. I have also seen flimsy crates used at times because the parties thought they were economizing on the expenditure of a few pence extra for thoroughly strong, sound, and suitable packages. I may here mention a case where I recently received twenty crates of mangos, more than half of which were broken in transit, owing to their being too frail for such a journey : and yet, these same crates are used largely in the United States for packing and shipping tomatos. Putting valuable good fruit into a frail, flimsy crate, is the same as putting new wine into old bottles ; and right here it is always well to put the question to one's self before shipping fruit away : 'Will those packages stand a bit of knocking about ?' Always be on the safe side. Never mind about extra freights, extra expense. There must be no cheese-paring for the successful fruit-shipper, otherwise he had better stay out of the business. If your fruit is of any value, first of all satisfy yourself it will reach the other side in A. 1 order or else it would be much better to keep your money in your pocket.

It appears hardly credible that 1,064 oranges can be placed in one box and yet withstand transportation, and arrive in perfect condition after ten days. Yet this is what is done by growers in Spain, and this number is one of their standard sizes. The Valencia orange grower and shipper has unquestionably got the business down to a very fine point. He has made a scientific study of it, and it has paid him for his study. It remains to be seen if the Jamaica shipper will follow on the same lines. Experimental and haphazard shipments will never pay. They must be made steadily, regularly, and carefully manipulated in order to win.

CULTIVATION OF BANANAS.

PLANTING.

The following notes on planting bananas are taken from the Hon'ble Wm. Fawcett's paper in the *West Indian Bulletin,* Vol. III., pp. 153-171, in continuation of those given on page 228 of our last issue :—

TIME TO PLANT.

If the aim is to get the main crop in for the American market from March to June, planting is generally done from January to April. Otherwise planting may go on at any time when rain or irrigation water can be relied on to help on the young plants. There is no doubt, however, that March and April is the best time for planting when all vegetation is springing naturally. In April there are always showers which help to start the eyes of the bulb in putting out leaves and roots, and when the May rains come, the young suckers rush along faster than at any other time of the year.

SEED SUCKERS.

Size. Suckers are selected for planting six to eight months old: they would then be about 10 feet high, with large swollen bulbs 8 to 10 inches across. They should always be suckers which have not been pruned, and these are indicated by the first leaves being narrow in proportion to their length, hence called 'sword' suckers.

Preparation. They are cut down to within 6 inches of the bulb, and the old roots cleared off. Some planters put them in the ground at once, others leave them to dry three or four days, and then plant. Others again find that they get better results by piling them in heaps eight to ten deep, then trash is thrown over them to keep off the sun, and they are left a month. The best way to pile them is to erect fences 3 feet 6 inches high to enclose a convenient spot 6 feet wide and of any length necessary.

Position. They are placed in the ground with the eyes 3 inches below the surface. On hill-sides they are put in slanting, and an eye at the side develops into the plant. On the flat they are set upright; if the centre sucker happens to shoot it is left, if not, the best of those growing all round is selected. Some planters, even on level ground, plant their suckers slanting, as few eyes develop into suckers, and the strength is thrown into the formation of the bunch which is consequently finer; but the plant has not such a good hold of the ground, the bulb decays and leaves a hole, and the plant is liable to be blown over. The soil should be well drawn up over the bulb when planted.

TRINIDAD CROPS.

The Trinidad *Mirror* for November 7, makes the following comments on the crops of the previous fortnight:—

CACAO.

There is plenty of cacao coming forward just now and the weather though rather dry is not unfavourable. Local prices are: Ordinary $12.75 to $12.80, estates $13.25, but some lots have been sold at $13.40, and it is reported that one lot of 120 bags realized as much as $13.60. There is very little Venezuelan coming forward at present. The last lot in the market found a purchaser at $13.80

SUGAR.

The weather is the chief topic. During the first half of the fortnight there was rain but the last week has been dry, which is unsuitable for planting because the earth becomes hard. Among the larger plantations considerable areas are being planted and a big crop is expected from them. In many fields the canes are arrowing and look very picturesque in consequence, but the canes are not so fine as they should be. This is more particularly the case with the canes of the farmers, many of whom are now turning their attention to ground provisions and fruit, the result of their disastrous experience with the last year's cane crop. The Savana Grande Produce Company is now in full work and is disposing of the provisions thus grown. In the sugar factories, notably the Usine St. Madeleine which is ever up-to-date, new machinery is being erected. Every year sees improvements in this gigantic sugar-making establishment which does the grinding and manufacture for the majority of the estates in the Naparimas and Savana Grande. The struggle against the beet is being still as gallantly fought as it ever has been. Some changes are being made in the personnel of the various factories, and it is said that Palmiste is going to give the Louisianian sugar boilers another trial. At Reform and La Fortuné, Mr. Fernandez and Mr. Hannays are to exchange posts. As is usual at this time of the year the 'pays' are small and trade in the vicinity of the estates is therefore rather depressed.

CROPS IN GRENADA.

The cacao crop has, says the Grenada *Chronicle*, commenced in real earnest and extensive pickings have already been made in all parts of the island. A record crop is expected if nothing intervenes to prevent it. The weather is all that the planters desire for their present operations,—alternate sunshine and showers; just enough of the former to dry their produce, and of the latter to bring the young pods on to maturity.

The crop of Indian corn has not been a very profitable one this year, the continuous heavy rains of the past month having, it is supposed, retarded the proper development of the cobs. Ground provisions are, however, fairly abundant, and the appearance of the fields of pigeon-peas promises a satisfactory yield when the reaping season comes round.

COTTON SEED OIL INDUSTRY.

The following interesting extract in reference to the cotton seed oil industry of the United States of America, is taken from the *Sugar Planters' Journal* for August, 1902:—

In connexion with the fertilizer industry it will be well for us to consider the cotton seed oil industry. An approximate estimate of the last cotton crop is 11,000,000 bales. Assuming that it requires 1,400 lb. of seed per bale, the total value of the crude seed, based on the value of $8.00 for 900 lb., is $88,000,000. This amount was paid to the farmer for a by-product that formerly had little or no value. There are now more than 400 cotton seed oil mills engaged in extracting and refining the oil of the seed. The value of the product (oil, meal, hulls and lint) turned out by these mills, based on the above crop estimate, is $142,560,000. The products with their values, from one ton of cotton seed, or 2,000 lb. are as follows:—

Lint, 20 lb. at 3c. per lb.	$ .60
Hulls, 891 lb. at 50c. per 100 lb.	$ 4.45
Meats, 1,089 lb. which on being pressed yield (crude oil) 289 lb. or about 35 gallons at 30c. per gallon	$10.50
Oil cake, 800 lb. at $1.00 per 100 lb.	$ 8.50
Total	$23·55

The above quantities and prices are only approximate, but represent a fair average. Cotton seed meal at this writing is worth $25.00 per ton. The 35 gallons oil on being chemically treated in its refinement increases about $5.25 in value. It is necessary to add this to get the total value of the seed oil products in the estimate given above. This is a splendid illustration of the importance and value of the application of chemistry in the utilization of by-products. It is well to mention here, that out of the cotton seed oil industry have grown up the cottolene industry, the oleomargarine industry, the compound lard industry, a branch of the soap industry, and all the out-growth of applied chemistry.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the **Commissioner, Imperial Department of Agriculture, Barbados.**

It is particularly requested that no letters be addressed to any member of the staff by name. Such a course may entail delay.

Communications should always be written on one side of the paper only. It should be understood that no contributions or specimens will, in any case, be returned.

All application for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 255 of this number.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News

Vol. I. SATURDAY, NOVEMBER 22, 1902. No. 16.

NOTES AND COMMENTS.

Blackbirds and Toads as Planters' Friends.

Patches of Guinea grass in Barbados were, some time ago, attacked by a caterpillar, the chrysalis of which was to be found in neat little pockets formed by folding the leaf-blades of the grass. The common Barbados blackbird was seen busily eating these destructive caterpillars, affording another example of the great agricultural value of this useful bird which all classes of the community should do their best to protect. The common toad or *crapeau* was another determined enemy of this pest. One toad dissected had as many as forty caterpillars, besides miscellaneous beetles, etc. in his stomach.

Packing Material for Cotton Bales.

The *Board of Trade Journal* reports that owing to the accidental wetting of a cargo of cotton by sea water, information of considerable value has been gained as to the relative value of two packing materials. 'A cargo, chiefly consisting of bales of cotton, was recently landed at Dakar considerably damaged by sea water. When the bales came to be opened for examination by the Board of Survey, it was found that two different materials had been employed by shippers for the inside packing of the bales, which gave very different results.

'In one case the packing used was oiled canvas, in the other tarred canvas. With the first the contents of the bales were in every case badly damaged, whereas in the latter they were practically undamaged, although in several cases the outward appearance of the bales led one to expect that the contents would be irretrievably spoilt.'

Packing Fruit for Export.

The extract on page 244 of this number, from the pamphlet on *Jamaica Fruit in British Markets* shows, once again, the absolute necessity of careful selection and packing, in any efforts to establish and maintain a successful fruit trade. As Mr. Gill significantly remarks: 'It is the little things that count.'

School Garden at St. Lucia.

The Forestière East Indian Mission School at St. Lucia is to be congratulated on the good progress made with a school garden during the past year. The account given on page 253 indicates that the work has been well carried out, through the energetic co-operation of manager, teacher and children. School gardens form an invaluable means of giving children a practical interest in plants, and it is to be hoped that other schools in the island will follow the excellent example set them at Forestière.

Diseases of Fowls.

The most important point in Mr. Barclay's notes on poultry diseases on page 250 of this issue is the necessity for cleanliness in fowl houses and runs. Some of the ailments from which fowls suffer are highly infectious and apparently incurable. It is to the advantage of every poultry keeper to maintain his birds in a healthy state, and this is best done by giving them clean and wholesome surroundings.

Utilization of Home Products.

The Barbados *Agricultural Reporter* in a recent article on 'Agricultural Economics' described the very special conditions prevailing in Barbados owing to the dense population of the island. It was pointed out that, 'The sugar industry is to-day, no less than it was sixty years ago, that which will afford the greatest amount of labour to the population. So far we may say the planters' devotion to cane cultivation may be defended.' Then having stated that there is at present no industry which could adequately take the place of sugar, the article continued: 'But, while this is true, it is also equally true that there is room for improvement in agricultural methods with a view both to increasing the export of certain goods and reducing the import of certain others. This subject has been briefly but lucidly discussed in an article entitled "Utilization of Home products" that appeared in the *Agricultural News* of November 8, which we have reproduced below and commend to the careful study of our readers. If every planter in the country would read, mark, learn and inwardly digest its contents, substantial benefit would be bound to result.'

Minor Industries in Louisiana.

As an indication of the work being carried out in other parts of the world, with the object of improving and establishing industries supplementary to the sugar industry, it will be interesting to mention that at the Agricultural Experiment Stations of Louisiana experiments in orange, cotton, tea, and other cultivations are favourably reported on by Dr. W. C. Stubbs in his Annual Report for 1901.

The orange trees, crosses between the hardy 'trifoliata' and various sweet oranges, are said to be doing well and are expected to fruit during the present year. If any edible fruit is borne by a single tree it will be reserved and used for purposes of propagation. In the experiments in cotton cultivation the cross pollination of desirable varieties resulted in the production of a very fine strain, the seed of which has been extensively distributed over the State.

Purchase of Feeding Stuffs.

A useful summary of facts relating to feeding stuffs, and in particular to oil cakes, is to be found in the April number of the *Journal of the Board of Agriculture* (England), Vol. lx., pp. 10-24. Concerning decorticated cotton cake, or the cake made from cotton seed after the woody shells or hulls have been removed, it is said: 'This cake, when well made and in good mechanical condition, may be considered one of the cheapest and most valuable foods at the farmer's disposal. Weight for weight, it contains a larger aggregate amount of valuable material than any other food.'

In purchasing this cake it is necessary first to see that it is in good condition and free from mould, and secondly, to ascertain that it has been made from properly decorticated seed. In some cases the hulls can be detected with the naked eye. But when the hulls have been finely ground the microscope is often necessary. The advantage to the buyer of obtaining a pure cake will be obvious when we point out that the addition of hulls often reduces the quantity of oil present from 10, to 5 or 6 per cent., and at the same time raises the fibre from say 5, to 18 or even 20 per cent.

Some Possibilities of Plant Breeding.

In experiments designed to improve plants by breeding, progress often seems so slow that the onlooker is apt to regard the efforts as wasted. In a paper contributed to the recent Plant Breeding Conference, Mr. Luther Burbank of California pointed out, in a striking way, the economic value of apparently insignificant results. According to the *American Gardening* he said:—

'It would not be difficult for one man to breed a new rye, wheat, barley, oats or rice, which would produce one grain more to each head, or a corn which would produce an extra kernel to each ear, another potato to each plant, or an apple, plum, orange or nut to each tree. What would be the result? In five staples only in the United States alone the inexhaustible forces of nature would produce annually without effort and without cost:—

5,200,000	extra	bushels	of corn,
15,000,000	„	„	of wheat,
20,000,000	„	„	of oats,
1,500,000	„	„	of barley,
21,000,000	„	„	of potatos.

'But these vast possibilities are not alone for one year, or for our own time or race, but are beneficent legacies for every man, woman or child who shall ever inhabit the earth.'

Mahogany Trade of British Honduras.

The Colonial Secretary at Belize points out, according to the *Board of Trade Journal*, that the exports of mahogany and logwood from British Honduras are decreasing on account of the unremunerative nature of the trade within recent years; but in the case of mahogany a trade is being done with the United States in round logs, the American market demanding logs with the bark on them. It is understood that the bark is used for staining purposes, and the very considerable loss of material which occurs in preparing wood for the English market is avoided. It is probable that if this trade develops, as it shows a tendency to do, the mahogany exports to England will diminish very considerably, as dealers will avoid the expense of squaring the logs and also escape the loss on measurement in the London and Liverpool markets.

The World's Demand for Rubber.

The September number of the *Agricultural Bulletin* of the Straits and Federated Malay States is almost entirely devoted to rubber cultivation and contains much information of general interest. In particular it deals with the Assam rubber tree *(Ficus elastica)* and the Para rubber *(Hevea braziliensis)*.

In an article quoted from the *Madras Mail* the following passage occurs: 'There is no doubt that the world's demand for India rubber is rapidly equalling its available supply. Hence higher prices for the raw material are progressively demanded, greater profit is therefore assured to the grower, and greater incentives are thus given to develop existing supplies and to create new ones, and further to ensure the most careful collection and most thorough curing. Some eight years ago the price of Para rubber was about 2*s.* 6*d.* per pound: this has steadily advanced until the price to-day reaches 4*s.* 3*d.* per pound, whereas the cost of collection remains practically the same.'

Steam Spraying Outfit.

The article on page 248 of this number is of interest as indicating the methods adopted in some parts of England to combat, on a large scale, the attacks of insect pests.

REPTILES OF BARBADOS.

In former pages of the *Agricultural News* reference has been made to the snakes and lizards of Barbados. We now propose to say a few words about the few remaining reptiles that occur here. The little Tree-frog *(Hylodes martinicensis)* though now so common was probably introduced to Barbados within the last thirty years. It is spread over the entire island and, as described by Colonel Feilden, 'until the ear gets accustomed or deadened to it, the monotonous incessant chirping of this frog throughout the night, during rainy weather, is enough to drive a person distracted.' It is found all over the West Indies, and about twelve years ago it was introduced along with plants to the Royal Gardens at Kew. There its incessant chirping is heard from the recesses of the hothouses even in the depth of winter.

There is little doubt that the Agua toad (*Bufo agua*) is another comparatively recent introduction to Barbados. It is a native of South America, but is found in nearly all the Lesser Antilles, and in Jamaica. It is stated that it was originally introduced to exterminate mice and keep off rats. The mungoose, in the absence of other food, has evidently been driven to prey upon the toad, for near the holes of the former piles of the remains of the toad are often found. The toad is still common near houses where it is comparatively safe from the mungoose. It is most useful in destroying caterpillars on sweet potatos and other crops, and should be encouraged. It is well known that an alligator was transported alive on the trunk of a tree from the continent of South America and landed at Barbados in 1886. It is not unlikely that other reptiles occasionally arrive here in firewood and similar cargo, but owing to the thickly populated character of the island they are killed before they become established.

GARDEN NOTES.

The Eucharis Lily.

The scientific, which as it happens is also the popular, name of this favourite garden plant is derived from the Greek meaning 'very graceful'. For the successful cultivation of Eucharis lilies it appears to be important that their roots should not be often disturbed. The *Cyclopædia* of *American Horticulture* says, 'When grown in pots they require a coarse, fibrous soil, composed chiefly of rotted sod, and enriched with about one fourth of dry cow manure and a sprinkling of bone dust. The pots should be well drained, for much water is needed during the growing seasons, but frequent potting should be avoided as the roots are impatient of disturbance. Shading from full sunshine is required.' These lilies suffer considerably from the ravages of a caterpillar, which eats the leaves and in a very short time defoliates the plants. These can best be combated either by keeping a watch for the little round eggs laid in clusters under the leaves which should be crushed, or by syringing the plants with Paris green or other arsenical poison. An ounce of Paris green in a gallon of water, with a handful of lime, makes a safe mixture to syringe on the plants, and a plant so treated is safe from the ravages of the caterpillars so long as the poison remains on the leaves.

SPRAYING FOR INSECT PESTS IN ENGLAND.

It has long been recognized that to ensure a full yield of hops in the South of England some measures must be taken to deal with the insect pests and diseases that attack the hop plant. A considerable amount of attention is paid to this point in the hop-growing districts, and though in England as in the West Indies, far too little seems to be thought of attacking insect pests on a large scale, the hop growers have faced the problem and, with the aid of entomologists and mechanical engineers, they have devised means of destroying the insect enemies of the hop plant on a large scale. Apparently the methods used in the hop gardens represent the highest developments of insect destruction in England and so are of special interest.

The hop is attacked by an 'Aphis,' similar to that found on cacao, corn and other West Indian crops, and this can best be destroyed by spraying, in the same manner as thrips on cacao, or scale insects on orange, lime, etc., are destroyed. Roughly speaking this spraying is done in one of four ways: (1) Knapsack machines, (2) Hand pumps, which work in a barrel or small tank on wheels, (3) Horse machines, (4) Steam pumps. The knapsack machines employed in England do not differ essentially from those used in the West Indies which are familiar to many people. The English machines are however, apparently, inferior to the American outfits used in the West Indies, and it is to be regretted that a really reliable and satisfactory Knapsack machine seems to be unknown in England.

The hand machines, working from a barrel or small tank, are similar to the Fruitall and other American machines now used at the Botanic Stations. They appear to be reliable but are usually fitted with Vermorel or other nozzles which do not give the best all-round work.

Horse machines are a distinct advance on the previous machines and undoubtedly do good work. For the special purpose for which they are used they are very good and would do excellent work on ground crops such as sweet potatos, green dressings, arrowroot, etc. The machines consist of an iron tank of 30 gallons or more capacity, with a pump driven from the axle of the wheels. The liquid is pumped from the tank automatically as the machine moves forward and passes through a series of nozzles fixed at the back of the machine. These nozzles can be arranged to spray down, or in any direction, and the work they do on hops is first-rate. For applying Paris green or kerosene emulsion on sweet potato these horse machines would do admirably, covering a far larger area than can be done with a smaller machine.

Finally there are the steam sprays in which steam is the motive power of the pump. This would seem to be the highest development of the spraying machine as applied to agriculture in England, and there is no evident reason why the same should not be applied in the West Indies. Through the courtesy of Messrs. Merryweather & Sons, Mr. H. M. Lefroy, Entomologist of the Department, was enabled to see a special trial of the steam hop-washing apparatus supplied to W. L. Hubble Esq., Hunton, Maidstone. The apparatus

consisted of a small portable pumping engine, similar to those used in fire engines, which pumped water from a stream, mixed it with a definite proportion of concentrated insecticide and pumped the liquor into the main pipe running to the hop garden a quarter of a mile distant. In the hop garden smaller pipes branched off at intervals and led to the rubber hoses which terminated in nozzles. The engine is small and can be readily moved about on a light two-wheeled truck (such as is used for the Fruitall machine), or can be carried on poles. It burns wood or coal and raises steam very rapidly. The main pipe to which it delivers is of galvanized steel in 15-foot lengths, and the lengths can be rapidly joined by flexible couplings. The first branch pipes are of rubber and these lead each to two branches of smaller hose ending in adjustable nozzles. The pressure at the nozzles is sufficient to give a good spray, and any number of nozzles up to the pumping capacity of the engine may be used at once. The system appears to be a good one, and the whole plant is quite portable. The main pipe is soon uncoupled and the complete outfit carried to a fresh spot: it obviates the difficulty of the water supply as the engine may be a long distance from the fields to be sprayed.

The special points in this apparatus consist in the portability of the whole outfit, the fact that the engine can be at the source of the water supply over a mile away, and in the excellent work it does. Also the machine can be used where a horse machine or even a hand machine on wheels could not go. It speaks well for the English farmer that such thorough and up-to-date methods are in use. The apparatus is necessarily costly at the outset, though it would appear to be cheap in use, but it is impossible to cover a large area of crop with small machines, nor are they economical in working. Generally speaking a good deal remains to be done in dealing with English pests: this is largely a question for the individual farmer to settle for himself. As far as spraying machines are concerned—and these form a large part of the problem—the smaller machines seem to be distinctly behind those used in America, and it is only in the large outfits that we find the excellence that might be expected. The horse machine is certainly worth adopting in the West Indies for ground crops. For permanent cultivations such as cacao, coffee, oranges, limes, etc., the planter would do well to consider whether it were not cheaper in the end to keep down his pests thoroughly with a steam apparatus. As an example of what should be done in this way the work done by the Kentish farmer is admirable and deserves the attention of every West Indian planter.

Fig. 16 Merryweather's Portable Steam Spraying Plant at work on Fruit Trees in Kent.

On the right is the engine which pumps the wash into the main pipe shown in the middle of the figure, from which it passes into the rubber hose used for spraying.

(From a block kindly lent by Messrs. Merryweather & Sons, Greenwich Road, London.)

POULTRY.

The following is Mr. J. Barclay's eighth contribution to the series of articles written specially for the *Agricultural News*. It contains practical suggestions for the prevention and treatment of some of the diseases of common occurrence among poultry. His notes on the cause and treatment of Roup will appear in the next issue:—

Some forms of sickness will occasionally occur in the best regulated poultry-yards: in those that are not well regulated, illness will occur only too commonly.

PROMPT TREATMENT NECESSARY.

While it is well to know how to treat derangements of your fowls, it is not wise to trust to that knowledge, or to certain specifics that may be recommended as 'cures,' and allow yourself to be careless in management so that sickness is certain to follow. Best not to keep fowls at all if you do not intend to take a watchful interest in them, as otherwise loss is certain. Fowls may be successfully put right again when they first show symptoms of being out of sorts if the treatment is prompt. If the cases are evidently bad, it is not worth the time to try to cure. The best remedy, the safest in infectious diseases, is the axe; and the body should be burned or buried deep at the root of some tree with lime over it. Prevention is better than cure, and with cleanliness all round, fresh food, and plenty of green stuff, clean water, cool shade, comfortable housing, and clean soil, there can be few troubles.

DISEASES OF FOWLS.

The chief diseases are cholera, roup, (including canker, diphtheria, and bronchitis), yaws and gapes. The disorder called cholera happens mostly in the dry weather; roup and gapes occur more in wet weather, and yaws anytime, and chiefly among chickens. Lice are often troublesome and are found mostly in setting hens. Perhaps the trouble that causes the most deaths among poultry in the West Indies—at least it, is so in Jamaica, is cholera (in Jamaica called 'fowl sick'). Any mysterious malady in Jamaica is termed 'fowl sick,' but the particular disorder, the most deadly and contagious sickness, is what is most commonly termed in the North, chicken cholera, and is really, I think, enteric fever.

ENTERIC FEVER INCURABLE.

This disease, when taken badly, is quite incurable and is very infectious, and therefore causes a serious loss to those poultry keepers whose fowls are attacked by it. When it breaks out in a district, numbers of poultry-yards suffers unless measures are promptly taken to stamp it out. The birds which are attacked usually die from twenty-four to forty-eight hours after the germs develop. The excrements are very peculiar in colour, greenish, thin and watery, with a good deal of froth, and before death the birds generally go dark about their combs and faces. When opened the whole of the intestines are found to be highly inflamed, and the lungs and liver dark and flabby.

HOW TO CHECK THE SPREAD OF DISEASE.

It is not possible to cure birds when once they are affected with this disease, but when it breaks out in a yard, serious loss may be avoided by promptly killing those birds which show symptoms of the disease, and burying them in plenty of lime. The other birds should then be removed to entirely fresh ground, over which plenty of lime has been thrown. Should any bird ail, it is advisable to kill it at once, also to remove the excrements from the run each morning, as the germs are contained in these, and unless this is done, a serious outbreak cannot be prevented. The birds which have been in contact with those which are diseased should have a dose of Epsom salts given to them, and two days afterwards a teaspoonful of castor oil. They require nourishing food, and plenty of fresh water, in which a good-sized piece of camphor has been placed. It is always advisable to disinfect the birds which have been with those suffering from any disease by sprinkling their feathers with a strong solution of disinfectant, and their drinking vessels should be scalded out with strong soda water. There is no treatment for enteric fever, but if preventive measures are adopted, a good number of birds may be saved.

CAUSE OF DISEASE.

This disease, as I have said, occurs during, or immediately after, long dry spells during which the ground where the fowls congregate together become infected with the excretions, for no matter how long their runs are, they flock together at feeding time and where they roost. When our heavy rains fall the air is purified and the soil and roosting places of fowls on trees washed clean. Fowls allowed to frequent very filthy dung heaps or pig pens are likely to be attacked by this disease.

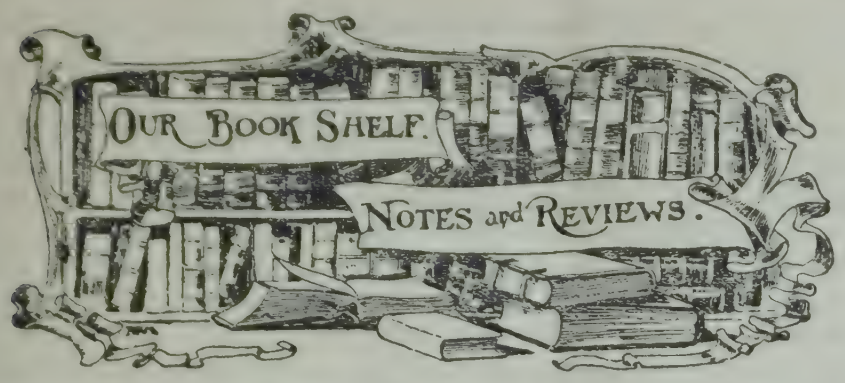
PREVENTIVE MEASURES.

It is preventable by taking care to shift about to widely apart spots when giving the morning and evening feed; or where the fowls are confined, by turning over the soil every other day, bit by bit, systematically, after the first two or three shallow diggings going deep as a fork or spade will go. The roosting places are often the deadly spots. If anyone troubles to examine trees where fowls have been roosting after two or three months dry spell, the cause of disease needs no further tracing. Where fowls are housed the houses should, in hot, dry weather, be as open and as airy as possible, and be cleaned out every day where there is a large flock; and every other day where there are only a dozen or so fowls kept. Corn must be fed very sparingly, if at all, in hot weather. Peas are better, and dry rice when it can be had cheap is a good change, and most beneficial where cholera is prevalent.

DEPARTMENT REPORT.

TRADE OF PARÁ FOR 1901. Diplomatic and Consular Reports. Foreign Office, July 1902.

The total exports of rubber from the States of Pará and Amazonas and the Republics of Bolivia and Peru during 1901 amounted to 30,336 tons, of which 14,791 tons were destined for Europe and 15,548 tons for the United States. The total for 1900 was 25,807 tons. The export of rubber from Pará was 12,040 tons and the total value £2,659,160; the total value of the export from Pará was £2,843,980. The total value of the exports for 1900 was £5,430,658, this year then showing a decrease of £2,586,678. The diminished trade is attributed to the crisis of the preceding year, the high rate of exchange and the rivalry of Manàos.



BEE-KEEPING IN JAMAICA. By F. A. Hooper. *The A. I. Root Co., Medina, Ohia, U.S.A. Price* 1*s.* 1*d. Post free.*

This pamphlet on Bee-keeping is attractively got up and has several illustrations of bee-appliances and of the apiary of the Hooper Brothers in Jamaica. The three kinds of bees which constitute a hive are described, some three pages being devoted to the queen.

The ten frame Root hive with Hoffman self-spacing frames is recommended, and the superiority of Italian over black bees is insisted upon. The author gives some very clear and interesting hints on the importance of having all colonies strong before the 'Honey Season.' He says :—

'Before the season opens, all needful appliances should be obtained and put together ready for use. It is bad policy to wait until the bees are storing honey, and swarming, before beginning to make preparations for the season. As soon as honey begins to come in, in January, all colonies must be looked over and the necessary attention paid to those needing it. Combs in the brood nest that are overstocked with honey should be extracted and replaced, to give the queen room to lay. Colonies that are strong in bees need not be extracted, except from the supers if any honey has been stored in them during the fall. Make sure that all colonies possess a laying queen.'

Queen and queen rearing is dealt with and a clear description given of the 'Doolittle Cell cup Method.' The pamphlet contains a list of the honey-producing flowers of Jamaica.

MARTINIQUE AND ST. VINCENT; PRELIMINARY REPORT UPON THE ERUPTIONS OF 1902. By Edmund Otis Hovey. *Extracted from Bulletin of the American Bureau of Natural History, Vol. XVI : New York, 1902.*

The author was sent to the islands as the representative of the American Museum of Natural History. This pamphlet is a preliminary report founded on his own observations during the seven weeks (May 21, to July 6, 1902) spent on the islands, and on the testimony of eye-witnesses.

The first ascent of the Soufrière, St. Vincent, was made by Mr. Hovey and some friends on May 31. They started from the site of Wallibou village on the leeward side and reached the rim of the old crater at 2,790 feet above the sea. On June 4, an attempt was made to ascend from the windward side : an altitude of 3,200 feet was reached, but the party was then obliged to turn back without getting to the crater, on account of dense storm clouds. On June 9, a third ascent was made and the rim of the crater was reached on the south-eastern side. The area of devastation in St. Vincent is reckoned at 46 square miles, practically one third of the area of the island. The deaths (estimated at 1,350) seem to have been due to the following causes :—

(1) Asphyxiation by hot dust-laden steam and air, (2) burns due to hot stones and dust, (3) blows by falling stones, (4) nervous shock, (5) burning by steam alone, and (6) strokes of lightning.

The area of devastation caused by the eruption of Mount Pelée is estimated at 32 square miles. Four ascents were made, in the course of which the greater part of the rim of the crater was traversed. Very careful and thorough investigations appear to have been made on the history and the results of the eruptions. Numerous plates reproduced from photographs are given, showing the volcanoes and some of the results of the eruptions. Maps of St. Vincent and of the north-western part of Martinique show the areas devastated.

The Plain Facts as to the Trusts and the Tariff is a very outspoken criticism, by Mr. G. L. Bolen, of two industrial problems as they affect America. Roughly, Mr. Bolen holds that the Trusts as they exist are largely bad, owing to the enormous profits going to promoters, but that they are capable of reform, and if reformed, that the principle of corporate control will be of service to society. On the question of Protection, he is strongly opposed to the prevailing American view, and argues incisively for a reform of the tariff. Incidentally, the book throws much light on the ethics of public life and business in the United States. The book is published by the Macmillan Company.

DEPARTMENT NEWS.

Dr. D. Morris, C.M.G., Imperial Commissioner of Agriculture for the West Indies, returned from his recent visit to the United States and Canada in s.s. *Orinoco* and landed at St. Kitt's on the 12th. instant. Before taking up his duties at Barbados, the Commissioner will proceed on a tour of inspection through the West Indies to arrange and provide for the work of the Department for the remainder of the current official year. It is probable that Dr. Morris will first of all accompany the new Governor of the Leeward Islands, his Excellency Sir Gerald Strickland, K.C.M.G., on a visit to Virgin Gorda and Tortola, and then proceed to Anguilla, Nevis, Antigua, and the Southern Islands, as far as Trinidad and Tobago.

Owing to the quarantine restrictions consequent on the outbreak of small pox at Barbados, it is feared that it will be impossible to hold the Annual West Indian Agricultural Conference in January next. The Conference of 1903 was proposed to be held at Trinidad, and it promised to be unusually interesting and useful, but owing to the fact that none of the Officers of the Imperial Department of Agriculture or the Representatives of Barbados would be able to attend, the Secretary of State has approved of the Conference being, for the present, postponed. It is sincerely hoped that the strenuous efforts that are being made by the Government of Barbados to deal with the outbreak will before long relieve the island of the serious disabilities under which it is now placed. In the meantime it is only right that the Governments of the other Colonies should adopt the most rigorous steps to prevent the spread of the disease outside Barbados.

GLEANINGS.

A fair quality of West India Isinglass is exported from Demerara. This article is the sound of a fish known in Demerara as 'Gilbaker.'

In some districts of British Guiana guavas are infested with the sapodilla magot. A large quantity of sappodillas are destroyed by the fruit-eating bat, the unripe fruit being bitten off the trees.

The fresh juice of the green fruit of the papaw is said to be a cure for ring-worm, one application being sufficient.

Years ago stingless bees occurred commonly in Demerara, and also in Berbice. They hived in the hollow of the Courida trees on the west coast, and their store of honey was gathered, clarified and sold at the rate of one shilling a bottle, by the residents.

The rainfall recorded at the Botanic Station, Tobago, during the month of October last, was 10·92 inches, being in excess of that for the corresponding period in the two preceding years.

Seeds of the male or solid bamboo *(Dendrocalamus strictus)*, received from the Imperial Department of Agriculture, the Botanic Department, Trinidad, and the Royal Gardens, Kew, are germinating at the Botanic Station, Tobago, and it is hoped that a number of plants will soon be available for distribution.

Diamond mining in British Guiana has been vigorously carried on during the past year, and 91,206 diamonds, weighing 8,227 carats, were registered in 1901-02 as against 4,981 (640·0 carats) in 1900-01.

The Government of St. Lucia has made arrangements with the Royal Mail Steam Packet Company to run a coasting steamer daily, except Sundays and Bank holidays, from Castries to Vieux Fort and back. Soufrière, Choiseul and Laborie are intermediate ports of call.

In order to improve the breed of cattle at St. Vincent a pedigree Hereford bull has been imported by the Imperial Department of Agriculture from Canada.

The earlier sowings of onions at Montserrat were transplanted about the end of last month.

Onions have been successfully grown in several of the West Indian islands, and their cultivation is now being attempted at St. Lucia. To encourage preliminary trials a certain quantity of fresh onion seed will be distributed, free of charge, on application to the Curator of the Botanic Station in the island.

Cassava is grown on a small scale in many of the West Indian Colonies. At Barbados the roots are now selling at $1.00 per 100 lb. The price varies at different times of the year, and is sometimes as low as 40c. for the same quantity.

The average yield of cassava per acre is stated to be about 5 or 6 tons in Florida. An experiment made in Barbados with wide planting (12 ft. by 6 ft.) gave a yield of about 5 tons per acre. In Jamaica a normal return is reported to be 10 tons.

With the rains the activity of the bees has recommenced; combs are being drawn out and honey stored. Six swarms of bees were recently taken, within a week, at the Experiment Stations at Montserrat. Three of these swarms were weighed as soon as hived, and were 4 lb., 6¾ lb. and 3½ lb. respectively. Taking 4,300 as the number of the bees to the pound, these swarms contained, approximately, 17,200; 29,025; and 15,050 each.

Barbados has experienced very welcome showers during the last week. The canes on the low lands on the leeward coast are still very short and dry, but in the hills, although backward, they are green and in a growing condition, and will doubtless benefit greatly by the break in the long drought.

The canes have arrowed very freely throughout the island.

The plant commonly cultivated in gardens in these Colonies under the name of 'mignonette' or 'West Indian mignonette' is interesting, inasmuch as it is the famous henna of the East. A decoction of the leaves in cold water yields an orange-coloured dye which stains the skin.

The cacao crop in Grenada promises so far to be very good.

The final arrangements are now being made for the Barbados Local Agricultural Exhibition, which it is proposed to hold at Todds Estate, St. Johns, on Tuesday January 13, 1903.

The Board of Education of Trinidad have decided to hold future school garden exhibitions at various country centres instead of at Port-of-Spain only.

The prickly pear can be utilized as a fodder during very severe drought. In Australia it is sometimes boiled and used for fattening cows. Horses are said to like it when a little pollard is added to the boiled mass.

EDUCATIONAL.

School Garden at St. Lucia.

In the course of his Annual Report on the Primary Schools in St. Lucia, for 1901. Mr. F. E. Bundy the Inspector of Schools makes the following interesting observations with regard to the course of instruction in actual operation at a School Garden in the island :—

A school garden was commenced at Forestière East Indian Mission School, which promises to be a very good one. From a report drawn up by the teacher, Mr. Neehal, a few extracts are given to show, how with a little good will, it is easily possible to start the practical study of agriculture in schools. 'Through the manager's (R. P. Cropper, Esq.) kind aid in paying for all such work as the children could not do, the site selected for the garden was soon cleared. Men were put to brush and cut down trees, and a proper shed was erected in a corner for the purpose of raising nurseries and preparing soil etc. While the garden was still in preparation, I began giving indoor lessons on seeds and seedlings, which were raised in small boxes. Lessons were also given on germination, preparation of seed boxes, etc. The necessity of moisture, warmth and air in germination was demonstrated.

'Finding it difficult to get the children to understand theoretical lessons, I resorted to practical work as soon as the garden plot was ready. I had 100 feet square of land enclosed by a proper fence and a row of peas and plantain plants planted round near the fence. The latter were chiefly got by begging for them from the gardeners round about.

'The whole of the garden is divided into beds, with a main path (4 feet wide) in the middle, on which we are now putting stones gathered by the girls and broken by the boys.

'We have already growing a bed of roses for the purpose of teaching grafting and budding later on; a bed of cocos with red beans in between ; a bed of cabbages ; another of sugar-canes ; a few banks of potatos, and a bed of pine-apples not yet three months planted and a few already bearing.

'We had a box of cacao nursery put in some time ago, and lately I had the children to transplant them. At the same time I gave a lesson on it. A bed is reserved for experiments in manure, which is divided into two parts. I have already had cabbage and large tomato seedlings given away to the bigger boys who were very glad to get them.

'With one or two exceptions the boys take great interest in the lessons, though the current language greatly militates against a proper understanding of the lessons given in English.'

From what I have seen on my visits to this school, one of which was paid together with Mr. G. W. Smith, Travelling Superintendent of the Imperial Department of Agriculture, and Mr. G. S. Hudson, Agricultural Instructor, I can fully endorse the above report, and I hope by the end of the present year (1902) there will be at least a dozen school gardens in the island which will resemble the one so well started in Forestière.

WEST INDIAN EXPORTS.

In the teaching of geography in these Colonies it is an advantage for the teacher to know at a glance the relative values of the articles exported from the various islands. The elementary books on the subject are often out of date and give merely a list of the articles exported, conveying no idea of proportion between the various products. To remedy this defect we reproduce the following table on the subject, compiled from the latest statistics from a pamphlet recently issued by the Department in connexion with the West Indian Section of the Toronto Exhibition :—

Exports from the West Indies, 1900-01.

Colony.	Sugar, Rum, Molasses.	Other Important Exports.		Total Exports.
	£.		£.	£.
British Guiana	1,440,000	Gold	390,000	2,000,000
		Balata	20,000	
		Timber, etc.	20,000	
		Diamonds	3,000	
Trinidad and Tobago	582,000	Cacao	980,000	1,800,000
		Asphalt	177,000	
		Bitters	37,000	
Grenada	Nil	Cacao	270,000	308,000
		Nutmegs & Species	30,000	
St. Vincent ...	7,000	Arrowroot	75,000	93,800
St. Lucia	56,000	Cacao	38,000	98,500
Barbados	661,900	Vegetables	8,400	694,000
Leeward Islands				
Dominica	1,700	Lime juice	31,000	66,800
		Cacao	24,000	
		Essential Oils	4,400	
Antigua	97,300	Fruit and Vegetables	1,800	102,000
St. Kitt's-Nevis	80,700	... ...		87,000
Montserrat ...	2,000	Lime juice	2,500	6,800
Virgin Islands...	Nil	Cattle & Stock	2,100	2,800
		Charcoal	500	
Jamaica	318,000	Fruit	786,000	1,800,000
		Coffee	157,000	
		Pimento	111,000	
		Dye-woods	108,000	
		Ginger	66,000	
		Tobacco	23,000	
	3,246,600		3,365,700	7,059,700

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—Oct. 28, 1902.—Messrs. J. Hales Caird & Co., Messrs. Gillespie Bros. & Co. and 'The Public Ledger,' Oct. 25, 1902.

Aloes—Curaçoa, 10/- to 40/-; Barbados 13/- to 35/- per cwt.
Arrowroot—St. Vincent, 3*d*. to 5¾*d*. per lb.
Balata—Demerara sheet, 2/6½ to 2/7 per lb. Dearer.
Bees-wax—Jamaica, fair to good pale £7 5*s*. to £7 15*s*. per cwt. In fair demand.
Cacao—T'dad, 58/- to 85/- per cwt. Dominica 56/- to 61/- per cwt. Grenada, common to fine 55/- to 63/- per cwt. Jamaica, 54/- to 63/6 per cwt. Market quiet.
Cardamoms—Mysore, 1/4 to 4/- per lb.
Coffee—Jamaica, 36/- to 125/- per cwt. Costa Rica, 38/6 to 99/- per cwt. Peaberry 75/- to 115/- per cwt.
Cotton—West Indian 4¾ to 5⅜*d*. per lb.
Fustic—£3 10*s*. to £4 5*s*. per ton.
Ginger—Jamaica, common to fine 35/6 to 50/- per cwt.
Honey—Jamaica 14/- to 22/6 per cwt. Rather dearer.
Kola Nuts—1*d*. to 4*d*. per lb.
Lime Juice—Raw, 10*d*. to 1/- per gallon; concentrated, £11 5*s*. to £11 10*s*. per pipe.
Logwood—Jamaica, £4 2*s*. 6*d*. to £4 7*s*. 6*d*. per ton.
Mace—1/3 to 2/10 per lb.
Nitrate of Soda—Agricultural £9 5*s*. per ton.
Nutmegs—90's to 60's @ 1/1 to 2/7, 132's to 95's @ 7*d*. to 1*s*. per lb.
Pimento—2¼*d*. to 2¾*d*. per lb.
Rum—Demerara 8½*d*. to 10½*d*., Jamaica 1/8 to 7/ per gallon.
Sugar—Barbados Muscovado, 12/- to 13/- per cwt.
Jamaica Muscovado 10/- to 13/6 per cwt.
Trinidad and Demerara 13/- to 15/- per cwt. duty paid.
Sulphate of Ammonia—£11 15*s*. per ton.
Tamarinds—Barbados 12/- to 15/6 per cwt.
Fruit—Covent Garden Market ('Gardeners Chronicle,' October 23, 1902.)
Bananas—6/- to 10/- per bunch.
Oranges—8/6 to 11/6 per case.
Pines—3/- to 4/- each.

Halifax N.S.—'The Maritime Merchant', Oct. 9, 1902.

Molasses—Barbados 24c. to 25c. Porto Rico 30c. to 33c. per gallon.
Oranges—Jamaica, $3.50 to $4.00 per box.
Sugars—Bright yellow, $3.70; No. 1 yellow, $3.40.

New York,—October 17, 1902.—Messrs. Gillespie Bros. & Co.

Cacao—African, 13¼c. to 13⅜c.; Caracas, 13¾c. to 14¼c.; Jamaica, no stock: fair ordinary, 11½c., good fermented 12c. to 12½c.; Grenada, no stock; 13½c.; Trinidad 13c. to 14⅛c. per lb.
Cocoa-nuts—Small Trinidads no demand; $11.00 to $12.00; Jamaicas $22.00 to $24.00 per M.
Coffee—Rio, good ordinary 5⅜c. to 5⅝c.; Jamaica good ordinary 6c. to 7c. per lb.; Manchester grades 8⅝c. to 11c. per lb.
Grape Fruit—$5.00 to $10.00 per barrel.
Oranges—$3.50 to $4.25 per barrel.
Pimento—4½ to 4¾c. per lb.
Rubber—Nicaragua scrap 53½c. to 54c. per lb; sheet 46c. to 47c. per lb.; Guayaquil strip 51c. to 51½c. per lb.
Sugar—Muscovado, 89°, 3c. per lb.; Centrifugals, 96°, 3½c.; molasses, 89°, 2¾c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—November 4, 1902.—Messrs. G. W. Bennett Bryson & Co., Ltd.

Molasses—10c. per imperial gallon, package included.
Sugar—Muscovado $1.35 per 100 lb.

Barbados,—November 8, 1902.—Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $4.00 to $4.12 per 100 lb.
Cacao—$13.00 per 100 lb.
Coffee—Jamaica and ordinary Rio $8.50 to $9.50 per 100 lb. respectively.
Hay—New Brunswick $1.00 per 100 lb.
Manures—Nitrate of Soda $60.00 to $65.00; Ohlendorff's Dissolved Guano $60.00; Sulphate of Ammonia $75.00 to $80.00; Sulphate of Potash $70.00 per ton.
Molasses—No quotations.
Onions—Madeira $2.25 to $3.00 per 100 lb.
Potatos—$1.60 to $1.85 per 160 lb.
Rice—Ballam $4.50 per bag (190 lb.); Patna $3.50 per (100 lb.); Seeta $3.50 per (100 lb.)
Sugar—$2.40 per 100 lb.

British Guiana,—November 5, 1902.—Messrs. Weiting & Richter.

Arrowroot—$9.00 per barrel.
Balata—40c. to 42c. per lb.
Cacao—native 11c. to 13c. sales. Balata—40c. to 42c. per lb.
Cassava Starch—$8.00 sales.
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica 11c. to 11½c. per lb. (retail.)
—Creole, 11c. to 12c. per lb.
Eddoes—$1.44 per barrel.
Onions—Retail 3c. Garlic 8c. per lb.
Pea Nuts—Curaçoa 3¾c.; American 5c. per lb. (retail.)
Plantains—24c. to 40c. per bunch.
Potatos English—$2.50 to $3.00 per barrel.
Rice—Ballam $4.75 to $4.80, ex store; Patna $5.75 to $5.80 per bag. Seeta $5.75 to $5.80
—Creole Rice 20c. per gallon, (retail.)
Sweet Potatos—Barbados $1.44, Creole $1.20 per barrel.
Tannias—$2.40 per bag.
Yams—$2.64 per bag.
Molasses—Vacuum Pan, yellow, 15c. per gallon, casks included.
Sugar—White $3.50 to $4.00; Dark Crystals $1.80⅛ to $1.90⅛; Yellow $2.10 to $2.25.; Molasses—$1.40 to $1.60 (nominal) per cwt.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—November 6, 1902.—Messrs. Gordon, Grant & Co., and Messrs. Edgar Tripp & Co., November 7, 1902.

Cacao—Ordinary to good red $12.75 to $13.00; estates, $13.30 to $13.60 per Fanega.
Balata—Venezuelan 43c. per lb.
Coffee—Venezuelan 6½c. per lb.
Onions—$2.50 to $3.00 per 100 lb.
Potatos English—$1.25 to $1.75 per 100 lb.
Rice—Yellow $4.50 to $4.75; White Table $5.25 to $5.75 per bag.
Sugar—For Grocery use, $1.60 to $3.00 per 100lb.

Publications on sale of the Imperial Department of Agriculture

FOR THE WEST INDIES.

The 'WEST INDIAN BULLETIN.' A Quarterly Scientific Journal.

Volume I. Reports of the Agricultural Conference of 1899 and 1900 and other papers; complete, in the original paper covers as issued, post free, 5*s*. The parts can no longer be sold separately.

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Volume III. No. I. Agricultural Conference of 1902: President's Address and Sugar Industry. No 2. Conference of 1902 (continued). Educational and General Papers. No. 3. Sugar Industry, Scale insects, School Gardens, Object Lessons, Volcanic Phenomena, etc. Price 6*d*. Post free 8*d*. each.

PAMPHLET SERIES.

The Pamphlets are written in a simple and popular manner and the information contained in them is especially adapted to West Indian conditions. They contain amongst other subjects, summaries of the results of the experiment work on sugar-cane and manures, the full official reports of which have only a limited circulation. The following list gives particulars of all the pamphlets which are still available. The missing numbers are out of print and can no longer be supplied :—

(3) Seedling and other Canes, at Barbados 1900. Price 2d. Post free, 2½*d*.
(5) General Treatment of Insect Pests, 2nd Edition Revised. Price 4*d*. Post free, 4½*d*.
(6) Recipes for cooking Sweet Potatos. Price 2*d*. Post free, 2½*d*.
(7) Scale Insects of the Lesser Antilles. Price 4*d*. Post free, 5*d*.
(8) Cultivation of Vegetables in Barbados. Price 2*d*. Post free, 2½*d*.
(9) Bee-keeping in the West Indies. Price 4*d*. Post free, 5*d*.
(10) Manures and Leguminous Plants at Barbados, 1898-1901. Price 4*d*. Post free, 5*d*.
(11) Hints for School Gardens. Price 2*d*. Post free, 2½*d*.
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[16.]

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AGRICULTURAL NEWS.

A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

VOL. I. No. 17. BARBADOS, DECEMBER 6, 1902. PRICE 1*d.*

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Winter Visitors to the West Indies.

LAST winter the number of visitors to Jamaica was the largest on record. It is anticipated that during the coming winter an unusual number of visitors will be attracted to this part of the world to witness the effects of the recent volcanic eruptions and enjoy the delicious climate and splendid scenery of these islands. The steamers of the Royal Mail Steam Packet Company leaving fortnightly from Southampton are largely patronized by winter visitors. The tour lasts sixty-five days and extends to the Leeward and Windward Islands, including Dominica, Martinique, St. Vincent, Grenada, Trinidad, LaGuayra, Caracas and Jamaica. The steamers of the Imperial Direct Line (Elder, Dempster & Co.) communicating between Bristol and Jamaica, also bring out a large number of visitors. In fact, this line offers special facilities for winter tours, and by its means the beautiful island of Jamaica is brought into closer touch with Europe than almost any part of the West Indies. From the United States and Canada, Jamaica 'the gem of the West Indies' may be reached by the weekly twin-screw steamers of the United Fruit Company from New York, Boston and Philadelphia. The Quebec Steamship Company offers 'a special thirty-day cruise through the Caribbee islands' in the s. s. *Madiana*, leaving New York on February 7 for Bermuda, St. Thomas or St. Croix, San Juan and Ponce (Porto Rico), St. Kitt's, Dominica, Martinique, St. Lucia, Demerara, Santiago and Havana (Cuba).

A special twenty-one-day tour in the West Indies is offered by F. C. Clark of New York in the magnificent s. s. *Kaiserin (Maria Theresa)* leaving on January 14, 1903. From Canada regular fortnightly excursions to these islands are offered in the winter season by Messrs. Pickford & Black of the Canadian & Imperial Line of Steamers from St. John's, New Brunswick, and Halifax, Nova Scotia. The round trip lasts about six weeks and facilities are afforded for

landing at nearly all the islands from Bermuda and St. Kitt's, southwards to British Guiana on the mainland of South America. There is also direct communication between Canada and Jamaica on the 15th. of every month from Halifax, Nova Scotia, touching at Bermuda and Turks Islands.

We might suggest to visitors that they would greatly add to the interest of their tour in the West Indies if they would visit the Botanic Gardens, Agricultural Schools and the Experiment Stations maintained in the various islands under the auspices of the Imperial Department of Agriculture. These institutions are usually close to the landing places and they offer an excellent means for becoming acquainted with the useful and ornamental plants of the tropics. At Jamaica, Trinidad and British Guiana there are Botanic Gardens of considerable beauty and extent, and these should certainly not be missed.

SUGAR INDUSTRY.

Sugar-cane Pests in the Hawaiian Islands.

The *Louisana Sugar Planter's Journal* of June 14, 1902, contained an article on the insect enemies of the sugar-cane in the Hawaiian Islands observed by Mr. R. C. L. Perkins, who made very extensive insect collections there. It is of interest to compare the insects found in or on the cane there with those known in these islands.

The cane borer *(Sphenophorus obscurus)* evidently corresponds to the weevil or ladybird borer *(Sphenophorus sericeus)* of the West Indies. Equally the small borer *(Hypothenemus* sp.*)* is equivalent to the shot borer *(Xyleborus perforans)*. There is no West Indian equivalent of the longhorned beetle *(Argosoma reflexum)* unless we include the Trinidad cases of palm weevil *(Calandra palmarum)*, an occasional pest of sugar-cane. The Nitidulid beetle *(Haptonchus* sp.*)* has a relative of the same family very abundant on the canes in Barbados and equally harmless.

Of caterpillars, the Hawaiian Islands have three ; the two *Omiodes* have no real equivalent cane feeding species in these islands, though there are several that equally eat grasses. The third *(Spodoptera mauritia)* is evidently similar to the West Indian corn worm *(Spodoptera frugiperda)*, which occasionally attacks young canes.

The four-banded fly *(Euxesta annonnae)* is represented here by *Euxesta stigmatias*. The mole cricket injurious in the Hawaiian Islands has not yet been recorded as injuring cane in these islands, though two species occur here.

The shorthorned Grasshopper *(Oxya velox)* is represented here by *Schistocerca pallens*. Mr. Perkins' remarks on the increase of Hawaiian species, introduced in 1892, are very interesting reading in the light of the efforts being made to ensure that no fresh pests will be introduced to the West Indian Islands. The longhorned grasshopper *(Xiphidium fuscum)* is here represented by two species of *Conocephalus*, both rarely injurious to cane. Of bugs, the Hawaiian Islands have two leaf hoppers *(Fulgoridae)*, an aphis and a mealy bug *(Dactylopius)*. The West Indies have one leaf hopper *(Delphax saccharivora*, also of the *Fulgoridae)*, an aphis and two species of mealy bug *(Dactylopius sacchari* and *calceolariae)*. In all of the fifteen insects mentioned by Mr. Perkins there are in the West Indies representatives of twelve. These are not only closely allied in every case, but work in just the same manner. The West Indies have also the moth-borer *(Diatraea saccharalis)* unrepresented by any insect in the Hawaiian Islands, and the root borer *(Diaprepes abbreviatus)*.

The similarity between the pests of the two localities is very striking, the more so as in no case are the species identical. The whole paper is of interest to West Indian sugar planters. Mr. Perkins draws attention to the danger of introducing such pests as *Apogonia destructor* from Java, or the moth-borer from the West Indies, etc. These remarks apply equally to these islands, both in the case of the many pests mentioned by Mr. Perkins as occurring in the Hawaiian Islands and those found in Java, Australia, etc. It is to be hoped that no new insect pests will find their way to these colonies, the list at present being sufficiently long.

Root Disease of Sugar-cane.

The roots of plants serve two principal functions. The first is to anchor the plant. The roots branch underground and become interwoven with the soil particles and thus function as anchoring organs. The second function of roots is to absorb from the soil water containing mineral salts, potash, nitrates, phosphates, etc., in solution, which serve as food for the plant. Anything that attacks and weakens the root system causes loss to the plant in two ways: it loosens the plant in the soil so that it is more easily uprooted, and secondly, it cuts off the plant's supply of water and mineral food.

The symptoms of root disease are similar to those caused by water and mineral starvation. The tips and edges of the leaves dry up, and finally, many of the leaves wither and fall off. If the roots are examined many of them will be decayed and rotten, or covered with a white felt or fungus tissue; the young roots are often seen to be dried up at their tips.

The most common root disease of the sugar-cane is caused by a fungus that belongs to the same group as the mushrooms and toad-stools. After wet weather

diseased plants and old stumps of the cane often bear groups of the small toad-stools of this fungus (*Marasmius*) as shown in the figure. These toad-stools are the reproductive organs of the fungus. On them spores ('seeds') are produced in immense numbers and are blown about by the wind.

Fig. 17. A portion of the base of a shoot of a sugar-cane attacked by root disease bearing the toad-stools of a fungus (a species of *Marasmius*) which apparently causes the disease.

The fungus usually spreads from one plant to another, underground, by means of its vegetative part —the white felt-like 'mycelium'. Consequently the first plant attacked becomes the centre of a circle of diseased plants, a circle which rapidly increases in diameter as fresh plants are attacked.

It is unfortunately only too easy to obtain specimens of the 'fruits' or toad-stools of this fungus. If one examines a number of old cane-stools, lying about a field or on a heap, a number will show a quantity of the white felt-like mycelium about the roots, etc., or sometimes a small group of the toad-stools. If one takes such a stump and keeps it moist (as under a bell-jar), in a few days a number of the toad-stools will appear, the cap will open out and, finally, the whole thing shrivels up, the spores having been distributed. The danger of leaving these old stumps about, when they come from a diseased field, instead of burning them thus becomes evident.

A short account of an attempt to apply remedial measures to diseased canes, will be found in the *Agricultural News*, Vol. I, p. 3.

COCOA-NUT OIL MEAL.

The cocoa-nut palm (*Cocos nucifera*) is found throughout the tropics, and large quantities of the nuts are exported from the West Indies, Ceylon, West Africa, the Pacific Islands, etc. Jamaica in 1900 exported cocoa-nuts to the value of £41,000, whilst Trinidad's annual output is from twelve to fourteen million nuts, worth about £16,000. The kernel of the nut contains a high percentage of a valuable oil, which is largely used for cooking, illuminating, etc., and as the source of 'nucoline' or cocoa-nut butter utilized as a substitute for lard and butter in cooking (see *Agricultural News*, page 53).

Prof. A. H. Church, F.R.S., in his book on *Food* records the following analysis of the fresh kernel of the cocoa-nut :—

	In 100 parts	*In 1 lb.* oz.	gr.
Water	46·6	7	200
Albuminoids, etc. ...	5·5	0	385
Oil	35·9	5	325
Sugar, etc.	8·1	1	130
Cellulose	2·9	0	203
Mineral matter ...	1·0	0	70

The nutrient ratio of this kernel is 1:16. The fresh nut, it will be seen, contains nearly 36 per cent. of oil, in addition to 8 per cent. of sugar and 5·5 per cent. of albuminoids. In the ordinary process of manufacture the greater part of the oil is extracted and a residue obtained known as cocoa-nut oil cake. This substance in common with several other 'cakes' obtained from oily seeds such as cotton seed, linseed, ground-nut, etc., has a high nutritive value.

The following analyses of cocoa-nut oil cake are taken from a paper from Mr. M. E. Jappa, *Report, Agricultural Experiment Station*, California, 1895-96, page 113. As a basis of comparison the mean of three analyses of linseed oil cake (compiled from data in the same paper) are also reproduced.

	Cocoa-nut oil cake.		Linseed oil cake. (Mean of 3 analyses.)
	1st. sample.	2nd. sample.	
Moisture	12·87	14·68	10·72
Pure ash	4·54	4·27	4·67
Crude protein... ...	20·06	19·16	29·55
Crude fibre	11·50	8·55	8·24
Nitrogen free extract [Starch, sugar etc.] ...	40·90	42·81	36·73
Crude fat	10·13	10·53	10·07

The author remarks : 'cocoa-nut oil cake meal is another much valued concentrated food, and is finding more favour every year with the dairymen of California. While not rating as high in flesh formers as either linseed or cotton seed meal, it appears in many cases to be more relished by the animals.'

Prof. W. A. Henry in his recently published book, *Feeds and Feeding*, gives a summary of an interesting experiment made by the French War Department as to the value of cocoa-nut meal for horses. 'The results proved that cocoa-nut meal was equal and even superior to the same weight of oats.'

WEST INDIAN FRUIT.

ORANGES IN THE SALE ROOM.

The following extract from Mr. W. Gill's pamphlet on *Jamaica Fruit in British Markets*, deals with the inspection, and sale of the fruit after it has reached its market:—

The fruit, which generally takes from 8 to 10 days on the voyage from Spain, does not need to be shipped in cool chambers but goes forward the same as any other ordinary freight, only in this instance, a steamer will take her whole cargo in oranges. These cargoes are invariably handled by a broker whose business it is to receive and inspect the shipment, classify it, and then advertise it to be put up for sale at public auction. Except towards the close of the season, the fruit rarely ever needs inspection, so perfect and uniform is the condition in which it arrives. The warehouse men can gauge the exact state of the fruit without hardly ever having to open a box. This is due to the systematic and regularly even packing, and the box being composed of slats with spaces between, where the hand when flat can be easily inserted. It is quite possible to see from the exterior of the package the even rows of beautifully graded fruit, with the wrapping uniform and intact, and the whole box and its contents perfectly symmetrical. The advantage that such a case of fruit derives in thorough ventilation, is at once apparent. After the cases are warehoused they are then sorted out into consignments corresponding to their respective shippers, each consignment being inspected and classified according to a scale, generally of six degrees, which splits the consignments up into various odd lots of from one case to thirty. A carefully prepared list is then printed and all the lots numbered thereon, together with the shipper's name, his brand and specifications. These lists are distributed among the buyers who attend the sale, and the intending purchaser can easily see at a glance what grade or quality of fruit he is buying, although in the majority of instances he never sees the actual fruit itself until it is delivered in his own warehouse. At some auctions, a sample case taken at random from each lot is sent up, opened and exhibited in the pit of the auction room, to show the general appearance; but invariably the buyer is guided in his bidding by the marks he sees on the broker's list. For the benefit of those who at any time may receive these brokers' lists,—copies of which with prices printed thereon are invariably forwarded by mail to the shippers and growers, after a sale is over—and may be unable to interpret these remarks of classification, I give the following key:—

Class	I	can	have	2	per	cent.	of rot
,,	II	,,	,,	5	,,	,,	,,
,,	III	,,	,,	10	,,	,,	,,
,,	IV	,,	,,	25	,,	,,	,,
,,	V	,,	,,	50	,,	,,	,,

Some brokers use instead, the marks, 'C, CC, XC, X.' There is also a class lower still, designated by the term 'wasty,' which mark attached to a case of oranges, is a sure blow to its hopes of finding its way into any other hands but those of the curbstone hawker or some old apple woman.

EXPORTATION OF FRUIT.

In our editorial on page 193 and elsewhere, we have repeatedly drawn attention to the damage done to the West Indian fruit trade by the exportation of fruit of bad quality to foreign markets. The following notes from the Jamaica *Gleaner* of November 12, furnish additional evidence on the same point. The statements are the result of the observations of Mr. W. Cradwick, the Agricultural Instructor at Jamaica, made during a recent visit to New York:—

Mr. Cradwick has just returned from New York where he made it his business to inquire into the conditions of the fruit market. A large quantity of fruit was coming in from Jamaica, and he was amazed at what he saw. He secured samples of the fruit and brought these back with him. A more despicable assortment of tropical fruit it would be hard to imagine. Some of it is quite unrecognizable. Grape fruit which is not grape fruit: a shapeless thing like an orange: a wizened piece of skin which was a poor enough lime at its best: an object with a resemblance to a pomegranate: and some other articles Mr. Cradwick shows.

The effect of the fruit cargoes composed largely of stuff like this is disastrous. The fruit men from the cities who come to look out for good fruit refuse to have anything to do with them, and when they are sold as Jamaica fruit an order comes back not to send Jamaica fruit in future. This is hard on the shipper who comes along with good fruit, the day after, and it practically amounts to one Jamaican robbing another. Quality is the only thing the salesmen can dispose of. Quantity, and the worst kind of it, is what Jamaica insists on supplying.

We understand that Mr. Cradwick's samples will be shown at the Legislative Council to-day. They form the best argument for the Government measure of protection that could be furnished.

CULTIVATION OF BANANAS.

TREATMENT AFTER PLANTING.

In previous issues (pp. 228 and 224) we have given extracts from Hon'ble W. Fawcett's paper on 'The Banana Industry of Jamaica' dealing with clearing the ground and planting suckers. We reproduce below his remarks on the care of the plants after they have been planted :—

VALUE OF PLOUGHING.

Various opinions are held by banana planters about ploughing. Some who have planted in light, loamy soils have been reaping excellent crops for some years without any ploughing. Others, with heavy soil, plough every eight weeks with a 6-inch plough, alternately one way and across. Others again plough only once a year.

A friend who is establishing a cacao walk with bananas before planting, ploughs, cross-ploughs, harrows and when necessary, trenches, afterwards he ploughs with a small plough (with moon-coulter attached) three to six times a year. On banana lines, where a plough cannot work, he forks occasionally and hoes frequently. He says that the plough is far more effectual in breaking up the soil than any other implement he has tried, and it keeps the land clean much longer. The plough works from 4 to 6 inches deep, and the cultivator 2 to 3 inches. Another planter forks once a year, and uses the cultivator to keep the weeds down. When the grass is too high for the cultivator he uses hoes, and only substitutes the plough for the hoe or cultivator when labour is scarce. Both plough and cultivator are kept to 2 inches in depth in order to avoid destroying roots.

ROOT PRUNING.

Keeping down weeds, maintaining a surface mulch, and loosening the soil, are all important matters in the cultivation of bananas as of other plants, and I am of opinion that a judicious pruning of the roots by the plough is also of great value, for as the roots do not naturally branch but grow straight out to great distances, pruning the roots induces branching at the several ends, and a further production of roots from the bulb.

A planter for whose judgement I have the greatest respect writes as follows:— 'I do not think that ploughing close to the banana and cutting through the roots does any harm. On the contrary, I am certain it does good—principally I think, because the cutting gives fresh impetus to the roots, and this activity increases the growth of the plant. Take, say, potatos or turnips, which are usually grown in drills 27 inches wide : so long as a horse hoe can work in these rows it is good cultivation to keep working, even to the damage of some of the leaves. Every time it is put through all the roots crossing the drills must be cut, yet you see the greatest improvement in the growth of these plants.'

EXPERIMENT AT THE HOPE GARDENS.

The following experiment, made at a banana plot in Hope Gardens, throws light on the subject of the formation of new roots induced by cutting them back. In planting the plot holes 3 feet wide and 2 feet deep were dug, the soil was returned to the holes and the suckers planted therein. The surrounding soil was ploughed and cross-ploughed after the plants began to grow. The soil is deep, rich, black, and rather heavy.

On November 19, a trench one foot wide and 2½ feet deep was dug half-way round a one-year old banana stool at a distance of 3 feet from the stem that was about to fruit, and the soil returned. In doing this the thick fleshy roots, some of them 5 feet to 6 feet long, were severed. No roots were found below 6 inches from the surface. Ten days later the soil between the first trench and 8 inches from the stem was removed, to the depth of 2 feet 6 inches and returned, cutting off all the roots with the spade to within 8 inches of the stem. It was noticed when doing this that the roots that were cut off at 3 feet from the stem had thrown out numerous fibrous roots down their entire length.

A month later, on December 30, the soil was opened up from 3 feet inwards. New roots were seen to have grown out 3 feet from the stem down to a depth of 2 feet from the surface. These roots were carefully followed back to the stem : some proved to be new roots direct from the stem, whilst others had grown out from around the cut ends of the original roots, one root giving rise to five or six vigorous feeders.

Some of the cut roots did not grow at all but remained just as they were, except that they died back some 2 or 3 inches; this was more noticeable near the surface where they would come under the influence of dry weather. Some deeper ones had, however, rotted back a few inches, due perhaps to the ragged cut by the spade, or the root itself being injured at its junction with the stem with the pull of the cut.

The roots on the undisturbed side of the plant simply lengthened out a little and remained near the surface, 5 inches being the lowest depth at which roots were found.

The plant did not seem to have suffered any ill effects from the disturbance of its roots on one side.

LATE PLOUGHING NOT ADVISABLE.

In my opinion ploughing so as to cut the roots close to the stem, should not be allowed when it is possible that the embryo bunch is being formed, as the stored food-material would be used to form new roots instead of being utilized in the bunch. How this loss of food-material affects the bunch we do not know—whether it delays the shooting, or affects the size of the bunch or the fingers. This subject of the use of the plough was discussed at the Banana Conference in Jamaica, and as a result some planters do not now plough except after the main crop for the American market is reaped, and not later than November.

Where ploughing is not the practice, the fork is used to great advantage when the young suckers are two months old.

Where the rains are constant, and the soil heavy, the cutlass is the best tool in weeding. The hoe and the assam fork and the cultivator are tools used under different conditions. The disc-harrow is an admirable instrument, and should be in constant use so long as the soil is sufficiently dry. If the ordinary plough forms a pan, a subsoil plough is used occasionally to secure good drainage.

Lectures to Teachers at Barbados.

The first of the lectures to the teachers at the St. Thomas centre, Barbados, on the manner and method of teaching agricultural science in Elementary Schools was delivered at Clifton Hill on Saturday, November 15, by Dr. Longfield Smith. Twenty-nine teachers attended.

The lecture was illustrated by numerous simple experiments, and at the close cyclostyle notes containing a summary of the lecture and a list of experiments were distributed to each teacher.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the **Commissioner, Imperial Department of Agriculture, Barbados.**

It is particularly requested that no letters be addressed to any member of the staff by name. Such a course may entail delay.

Communications should always be written on one side of the paper only. It should be understood that no contributions or specimens will, in any case, be returned.

All application for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 272 of this number.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News

Vol. I. SATURDAY, DECEMBER 6, 1902. No. 17.

NOTES AND COMMENTS.

Requests for Information.

On November 10, a correspondent in Trinidad wrote asking to be supplied, 'either directly, or through the columns of the *Agricultural News*, with an analysis of cocoa-nut meal.' In response to his request the notes on page 259 of this number have been published. The Department is prepared to supply whenever possible, information on agricultural questions, and the columns of the *Agricultural News* afford a ready means of giving a wide publicity to facts of interest throughout the West Indies. We trust other readers will avail themselves of this method of obtaining help on any matters, in which it may lie within the power of this Department to assist them.

School Gardens.

In our last issue we drew attention to the promising condition of one School Garden in St. Lucia, recently started and carried on by the energy of manager, teacher and scholars. At Trinidad the movement was taken up earlier, and it is gratifying to find that there are now 149 school gardens in the Colony, of which no less than 78 were of sufficient merit to obtain the Government Bonus at the last examination. Some of the faults in the gardens and the best methods of remedying them are dealt with on page 269.

Pests on Lime Trees at Dominica.

The scale insects which did so much harm to lime cultivation in Montserrat some years ago, though present in Dominica, do not yet seriously affect the trees, and they may never do so as the climatic conditions appear adverse to their rapid increase. While this is a subject for congratulation, it must not be assumed that the lime trees in Dominica are free from pests inimical to plant life. The climatic conditions which tend to keep in check scale insects specially favour fungoid growths, and it is from this quarter that the lime cultivation in Dominica is already suffering. If measures are not taken to combat their attacks, the matter will probably become very serious to planters in a few years.

In the majority of cases these fungoid attacks are due to carelessness in pruning, and in omitting to apply covering such as coal tar to the fresh wounds. In many instances in pruning the trees, no attempt is made to cut or saw off branches close to the main stem, but usually about a foot of stem is left. This dies, and is at once attacked by a fungus, which establishes itself, spreads to the living tissues and slowly, but surely, kills the tree.

Planters often do not realize the real cause of the ill health of their trees, because the ill effects which follow bad pruning are not visible to the eye for some long time after the fungus has gained an entry. Planters would do well to look carefully into this matter, and adopt remedial measures to plants now suffering. They should prune more carefully in future, and regularly apply some covering to all wounds and cuts on the trees. For a fuller discussion on this question see the pamphlet *General Treatment of Fungoid Pests*, recently issued by this Department.

Creosoted Timber in the West Indies.

In those tropical countries where hard wood is unobtainable, the use of creosoted timber is to be commended. A good illustration of its value is to be seen in the case of the telephone system in Antigua. Here ordinary pitch pine was formerly used for posts, when it was found necessary to renew the lines about every three years.

Creosoted pitch pine posts were tried and some have now been in use for five years, and are still perfectly good and appear safe for some years to come. Although costing more in the first instance, there is considerable economy in the long run.

The importation of creosoted pitch pine in the ordinary course of business is to be desired, it would then find extensive application in building, for floor joists, sills and similar work, as well as work exposed to the weather, such as fencing.

A brief review of a recent publication dealing with the general question of the decay of timber is given on page 61 of this Journal.

The Introduction of New Vegetables.

An interesting instance of the difficulties experienced in attempting to introduce a new vegetable into any locality is given by Mr. P. MacOwan, Government Botanist at the Cape of Good Hope. He received a dozen fruits of the Christophine or Cho-cho, and in the hope of bringing this excellent vegetable to general notice at the Cape distributed them throughout the Colony. One grower was very successful and soon had a crop of ninety fruits. Efforts were made to bring them prominently to notice but without much success. Mr. MacOwan continues:—

'Two or three other amateur gardeners now have the plant, but it is disappointing to find that it has not been taken by the purveyors of our vegetable market, and is only known to a few people as a curiosity. I dare say if we had on record the primeval history of the cabbage or of the turnip, we should find that the man who first grew and ate the esculent novelties was similarly disappointed when he pressed them upon the attention of his prehistoric neighbours. They no doubt, asked why we should venture to eat such new fangled stuff, when there was such an abundance of acorns to be had—a food which had stood the test of centuries, and had been eaten by their forefathers from time immemorial.'

Exportation of Fruit.

The article on 'Packing Oranges' on page 244 of our last issue and that on 'Oranges in the Sale Room' on page 260 of this number give a good idea of the careful methods adopted by the Valencia orange shippers, and the excellent results achieved. The high standard attained by the Valencia exporters is well indicated by the description given of the orange boxes, containing their 'even rows of beautifully graded fruit, with the wrapping uniform and intact, and the whole box and its contents perfectly symmetrical.' Moreover it is reported that 'except towards the close of the season, the fruit rarely ever needs inspection, so perfect and uniform is the condition in which it arrives.'

With this pleasing picture before us, it is distressing to read of the condition in which some, at any rate of the Jamaica fruit reaches New York (see page 260).

Until this evil is remedied it is impossible for West Indian fruit to secure the confidence of buyers in foreign markets, and until this confidence is obtained, the West Indian export fruit trade cannot hope to succeed.

Sugar-cane Pests at Hawaii.

The notes on page 258 show that the sugar planter in Hawaii is troubled by pests very similar to those affecting the canes in the West Indies. The Hawaiian planter is fortunate in not having to cope with the moth-borer, although as we showed on page 115, this formidable pest was nearly introduced recently in a barrel of plants from British Guiana.

A Cane Loader.

A mechanical device capable of performing this portion of reaping a cane crop has long been a desideratum. The *Louisiana Planter* reports that a machine, adapted to this end, is now in active operation on many plantations in Louisiana. At one trial twenty-two cars were loaded in two hours fifty-five minutes, the loads varying between 2,400 and 3,000 lb. each.

Broom Corn.

Large quantities of brushes, brooms, etc., made of broom corn are annually imported into the various West Indian islands. If the plant producing the brooms could be grown locally, a considerable industry might in time be developed and the money now sent out of the country for these articles be retained, with corresponding advantage to local agriculturists.

The broom corn is a close relative of the ordinary Sorghum or Guinea corn which does so well here, and there seemed no reason why it should not thrive in the West Indies. To test this point a small plot was grown last year at the Botanic Station, Antigua, with very successful results. The arrows were dried, cured and made up into small brushes, which were exhibited at the Agricultural Exhibition in February.

We have recently seen a small patch of broom corn in Barbados, in excellent condition.

There would appear to be no reason why this plant should not be more extensively grown and the produce made into brooms, etc., for local sale and use.

Malaria and Mosquitos in the Campagna.

The Diplomatic and Consular Report No. 2896, on the *Trade of Rome and District* for 1901 contains some interesting notes relative to the success of the efforts made to cope with malaria in the Campãgna. 'Government and the public have been of late most strenuously grappling with the malady that infested the district for so many centuries, playing great havoc with the inhabitants. The majority of the cottages are now provided with wire nets so as to prevent the intrusion of mosquitos.'

From the subjoined table, which gives the percentage of fever-stricken in the Campãgna at various periods since 1888, the reader will perceive the great improvement achieved, especially since 1897, when the mosquito theory was advanced:—

Year.	*Number of inhabitants.*	*Percentage of fever-stricken.*
1888	7,898	21·46
1891	8,074	16·76
1894	7,996	20·00
1897	9,209	6·54
1900	12,276	3·73

INSECT NOTES.

Screw worm in Cattle.

Mr. C. W. Meaden contributes information on screw worm in cattle to the *Proceedings of the Trinidad Agricultural Society* for June 1902, his paper being reprinted from the *Field Naturalist's Journal* of 1893. The life history observations are practically identical with those already published in the Departmental pamphlet No. 14, *Screw worm in Cattle at St. Lucia* (see also *Agricultural News*, Vol. I, pp. 8 and 73). Mr. Meaden is not able to state where the fly breeds in the usual way, outside the cattle. There can be no doubt that this infestation of living animals is abnormal and that the fly breeds as a rule in some decaying animal matter. Any reduction in this breeding material would lead the fly to seek for other food for its young, and this probably explains its attack on cattle.

Mr. Meaden's paper contains a remedy that may prove useful in St. Lucia and elsewhere. He states that 'Capuchin powder' (prepared from the dried seed of *Schaenocaulon officinale*) when put into a wound full of maggots, either drives them out or kills them. Equally efficacious is a plant called the 'Madar' or 'Redeye,' found growing in Trinidad pastures, of which the pounded leaves and flowers are used to dress the wound. These suggestions are worth the attention of stock owners in St. Lucia, who should try these two plants as substitutes for carbolyzed oil or Jeyes' fluid.

A New Insecticide.

CRUDE OIL AND SOAP.

In a previous issue of the *Agricultural News* (p. 216), mention was made of an emulsion of crude native petroleum used in Barbados for spraying young corn. The definite proportions of this mixture have now been settled and the compound may be made as follows:—

Place ten pounds (10 lb.) of whale oil soap in a metal vessel (such as a kerosene tin) and heat slowly until the soap melts. In a separate vessel dissolve 4 oz. napthalene (powdered) in 5½ pints of crude petroleum. Add this to the boiling soap, and *stir thoroughly till both are well mixed.* On cooling a solid mass is produced, which readily lathers in water and can be used at the rate of 1 lb. to 3 lb. per 10 gallons of water. The compound contains a large proportion of crude petroleum rendering it a valuable insecticide for scale insects, plant lice, white blight, and also for such pests as corn fly. Moreover, it is very effective against ticks and other vermin on cattle, horses, dogs, etc., if used simply as a soap. The emulsion being solid is easily handled and will keep indefinitely. It needs only to be rubbed up in cold water to be ready for use.

The mixture is evidently only a soap containing a large proportion of crude petroleum and a small amount of napthalene, and is likely to prove a valuable insecticide. A fuller account of the mixture will appear in the *West Indian Bulletin* shortly. Soft soap may be substituted for whale oil soap, but in this case, the above proportions will need to be varied. If a soap containing much water is used, a larger quantity must be taken proportionately, and the excess of water boiled off. The above proportions can only be adhered to if the soap is very dry and semi-liquid whale oil soap will need to be boiled down before the oil is added.

ARBOR DAY IN ANTIGUA.

We mentioned in a previous number of this Journal (p. 123) that the Agricultural Society of Antigua had agreed that, for this year at least, November 9, the King's birthday, should be observed as an Arbor Day throughout the island. We find by the Antigua *Standard* of November 15, last, that day was observed as a Bank holiday and the function came off most successfully. 'By 9 o'clock,' says the *Standard*, 'the school children from all parts of the island were mustered in and about the Victoria Park; the boys of the Antigua Grammar School as also the students and scholars of the Buxton Grove Theological College and secondary school, with their respective principals were also present and took part in the proceedings. Altogether they numbered hardly less than 3,000, while the spectators may fairly be estimated at 5,000. It was a big turn out to witness the inauguration of "Arbor Day" in Antigua, as a custom to be observed annually in future.

'As the result of the day's function, there were planted—

'A group of sixteen Palm trees in the triangular space, at the top of High Street and east of East Street, approximately centred by the Governor's tree.

'A circle of Palm trees around the Band Stand.

'A clump of White-woods [*Bucida Buceras*] in the Park.

'An avenue of seventy-one Mahogany trees along the main road in the Park.

'It is proposed that on next Arbor Day there shall be local celebrations in every parish in the island, when it is to be expected that the grounds surrounding Churches and schools, and other public places will be beautified. These country celebrations also offer better facilities than that in the Victoria Park for the planting of fruit trees in suitable places, as well as trees for ornament. We hope the country schoolmasters will co-operate to the best of their ability in this matter.

'Trees are needed absolutely in the country districts, where the shortsighted planter is satisfied to sacrifice his crop rather than appropriate land to anything but cane.'

It is gratifying to note that the people of Antigua have resolved to make Arbor Day an annual function, and it is hoped that other colonies will follow their example in this respect. We might add that all the trees planted at Antigua on this occasion were supplied from the Botanic Station there, and personal assistance was given by the Curator, Mr. W. N. Sands, to the Arbor Day Committee in carrying out the arrangements.

BEE-KEEPING.

Uses of Honey.

As it appears that little use is made of honey, other than for actual consumption, in the West Indies, it may be of interest to refer to the matter here.

Honey possesses many valuable qualities and the presence of formic acid renders it capable of being kept for years. There are many economic uses of honey apart from its value in embalming bodies as practised on the bodies of illustrious men as far back as the time of Alexander the Great.

For many years past honey has been used in all parts of the world in the manufacture of certain drugs and syrups sold by chemists; also in the manufacture of sweetmeats, cakes, etc., and has from the remotest times been considered a wholesome and nourishing food. It has been repeatedly shown that cakes made with honey will keep fresh for many months. For medicinal purposes honey cannot be too strongly recommended. Whilst for children and elderly people honey is unequalled. All foods must undergo a process of digestion by which the foodstuffs are dissolved and rendered capable of being made use of by various parts of the body. Honey requires very little, if any, digestion, and is therefore ready for immediate assimilation or absorption. Honey is especially recommended in cases of dyspepsia, rheumatism, asthma, hoarseness and all affections of the chest. As a gentle laxative no better medicine can be taken.

To emphasise these facts the following remarks may be useful:—

'I consider honey, as a food, second to none, on account of its great solubility in the blood, its power of providing for the heating of the body, and the maintenance of life. I strongly recommend it as food for children, especially for those who are growing quickly, since it provides an easily digested food, and changes their pale faces and languid condition to rude health. It is also useful to the aged, from its heat-giving properties. Do you wish to enjoy a green old age? Eat daily the most precious food of the ancients—milk and honey. Break some bread in a cup, with milk and pure honey. This is the most healthy, the most nourishing, and the most relishing breakfast.'

Bee-Keeping in Jamaica.

The above is the title of a short paper in the *Bee-keeper's Record* for November, by Mr. W. Crawshaw. It contains many interesting facts worth recording. He says:—

There is no doubt, that many spots in this island are El Dorados for the experienced bee-keeper, but I would remind *Record* readers that the produce of this Colony is all extracted honey, and that we think ourselves fortunate when we clear 2*s*. a gallon. Imagine an apiary of 400 hives placed on blocks near the ground, and shaded gently and intermittently by the waving plumes of the majestic cocoa-nut palm, surrounded by a vast extent of cultivated land, growing bananas, cocoa-nut and logwood, with occasional tamarind and orange sprinkled between. Bananas keep the bees at it practically all the year round with pollen, but unfortunately, although they produce abundance of nectar, they possess a long nectary which is a trial of Tantalus to the eager *Apis melifica*. The cocoa-nut gives pollen and a fine honey all the year round in small quantities.

But the logwood! For three months in the year the bees—provided they are in proper working order—stream in in clouds almost darkening the air, laden with the finest amber-coloured honey. Last year a hive gave me 37½ gallons of pure logwood honey, and the same queen was presented to me by a gentleman who stated that she had given him close on two barrels of honey, or 50 gallons, the year previous.

I mentioned just now that the blossom of the banana has a deep ovary. A great deal has been written lately in America about breeding long-tongued queens, so as to reach the nectar in red clover. With careful work I believe the change might be effected; but would it not be infinitely easier, and answer the same end, to shorten the nectary of the clover blossom? I understand that practically anything can be done in the way of changing the form of flowers by careful selection and cross-fertilization, and surely a red clover might be produced which would make itself a little more sociable to the bees.

If any bee-keepers should think of coming to Jamaica to carry on their business, let me give them the following useful hints:—

(1) There is plenty of room. (2) They will require £300 capital to establish an apiary of 300 hives with good materials. (3) They must take time and look round carefully before selecting a locality.

On the other hand, an apiary intelligently worked should bring in £1 per colony per year. I have already averaged 8½ gallons for an apiary of ninety hives, and this in a locality that I consider far from the best. Any one therefore who is prepared to put up with a change of surroundings and the curtailment of a few comforts, may derive a very fair income from an apiary in Jamaica.

VELVET SEEDS.

(Quiina jamaicensis).

One of the most beautiful and interesting seeds of Jamaica is that known as velvet seed, found in the mountains of St. Ann's. This tree, or rather shrub, belongs to the natural order *Guttiferae*, and is consequently allied to the hog-gum and the Santa Maria, as also to the celebrated mangosteen of the East Indies.

It is to be remarked that in the case of the velvet seed, the edible pulp usually attached to this portion of the fruit (and which in the mangosteen gives to it its great value) is converted into a soft, velvety tomentum of rich chestnut colour, but so bright and silky as to render the seeds objects of great beauty.

It is to be regretted that these seeds are so rare and difficult to procure in large quantities, as otherwise they would undoubtedly form an important article of commerce. It may be added that the velvet seed tree is to be distinguished from a plant common in the plains and used for ornamental purposes, known as velvet leaf (*Sida cordifolia*), as also from pareira-brava, sometimes known as velvet leaf (*Cissampelos Pareia*), a medicinal plant of some value.

POULTRY.

The following is a continuation of Mr. Barclay's notes on the cause and treatment of diseases of common occurrence among poultry. Here he gives practical suggestions for the treatment of Roup. His notes on the cause and treatment of Yaws will appear in the next issue :—

ROUP.

The greatest trouble, I think, especially in moist climates, is roup, which term covers several different kinds of colds. In bad cases, all the forms may be present at once. The first symptoms are a slight watering in the eyes, and the skin above the eyes looks blue. Then there will also be watery stuff running from the nostrils, and the mouth of the chicken will have a foul smell. Later, if left unattended, the eyes become filled with sticky, yellow matter, and close up altogether. If still neglected, the yellow matter becomes hard, covers the whole of the eye-ball, and if left alone it will work outwards and the fowl will ultimately scratch the lump of hard matter out, when the eye will also be found to be gone, that is, if the fowl does not die before it reaches this stage. In the very worst cases the mouth becomes filled with a yellow growth which has a very foul smell. This form of cold is called canker, and is very contagious, and when the growth extends down the throat, it is diphtheric roup, the worst of all. In such cases the fowl should be killed at once and either burned or buried at the root of some tree, covered with lime, and stones piled on the top, to prevent dogs scratching the body out.

TREATMENT.

If taken in hand at once, it is seldom that simple roup cannot be checked; but as it is usually left until the eye becomes closed, it then causes a good deal of trouble to cure. Whenever a hen or chicken appears with watery matter in its eyes, ten drops of Jeyes' fluid or some other good disinfectant, or if nothing of the kind is at hand, a teaspoonful of kerosene or even lime juice and a litttle sweet oil should be added to half a pint of water, well stirred, and the eyes washed out in the morning. If done in the evening and the birds are left to go to roost with wet eyes, the cold will probably be worse in the morning. It is important to note this, as many people work away in the evening, trying to cure their chickens, and when later the cold breeze blows upon their wet eyes, the trouble is aggravated. When the watery matter is seen about the nostrils of the bird, they should also be gently washed, and the mouth should be cleaned out daily. To clean the eyes and nostrils, a small piece of rag should be taken, dipped in the mixture mentioned, the surplus water squeezed out, and the eyes cleaned first; then the nostrils, and the mouth can be cleaned with the little finger or another piece of rag rolled up like a quill, or a feather. The rag should afterward be burned. When the hard yellow matter has already gathered in the eyes of the bird, a little piece of pointed stick, not too sharp, should be taken, the top eyelid of the fowl turned far back, the red skin then noticeable down over the eyes should be lifted by the stick, the latter is worked round, and the hard matter hooked out. This is a delicate operation but may generally be done safely, without injuring the eye. In canker or diphtheric roup where the mouth and throat becomes filled with a cheesy gathering, the bird should at once be killed as already mentioned. There is nothing gained by trying to cure such birds, and the risk of infection is great. In all cases of cold in the eyes, tincture of iodine, to be got from all chemists in a small phial, cost three-pence, which will last for a long time, should be painted round the eyes of the birds, with a small camel hair brush, taking great care that the stuff does not get into the eyes. The iodine draws out the inflamation

CAUSE OF DISEASE.

Roup is caused by a chill, and through the bird sleeping on damp ground or wet roosts. They are predisposed to roup and all troubles by running and feeding on stale ground as described under 'cholera,'—or by being shut up in a bad-smelling house. Cleanliness and comfort will keep them clear of roup.

BRONCHITIS.

Birds otherwise well kept, but which have been subjected to a sudden change, such as exposure to sudden heavy rain after a long, dry, hot spell, suddenly develop a rattling or wheezing noise in the throat. This is bronchitis, and it is most difficult to get rid of, while if happily you manage to cure it, it still recurs very readily.

HOW TO CURE.

To cure, stop feeding corn; feed ground peas and dry rice for hard food; give a dose of Epsom salts once a week; put a drop or two of sulphate of iron in the drinking water (a couple of rusty nails will do), and paint the bird's throat persistently with tincture of iodine twice a day.

A good pill to give is made thus: – Take a piece of tallow candle (must be tallow), work some Epsom salts and a little ginger or pepper into it, and give to the birds. This is wonderfully effective.

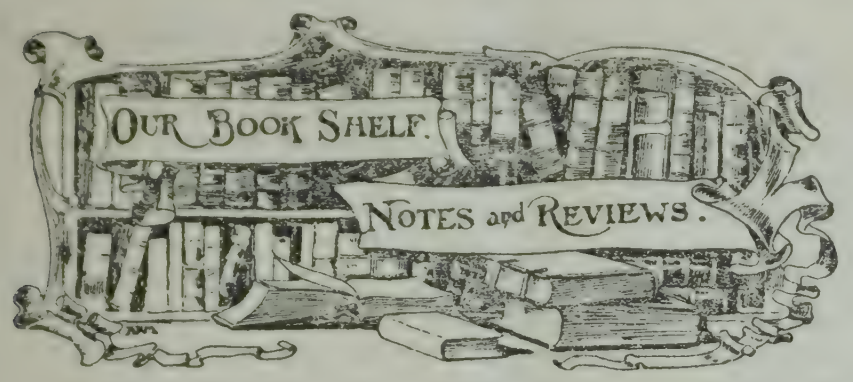
A GENERAL REMEDY.

For all forms of roup, but bronchitis especially, and also for gapes, the following plan will cure when cure is possible at all, but it necessitates care and judgement when putting into effect, so that the fowls may not be suffocated.

Take Stockholm tar, eucalyptus oil, or turpentine, (either is good) and put into a little tin dish; have your fowl in a closed box, put a red-hot iron in the tar and allow the fumes to fill the box. The fowl should be lifted out for a breath after half a minute, and put back again for small intervals. Where many fowls are thus ailing they can be put in a closed house and thus subjected to the fumes of tar, or turpentine.

Raising Chickens at Grenada.

The Rev. G. W. Branch of Good Hope Estate, Grenada is at present conducting an interesting experiment in raising chickens by the aid of an incubator. So far he has been successful in rearing several hundred chickens. Mr. Branch finds that a mixture of cracked corn, ground bones and fresh meat forms an excellent diet. His method of supplying meat, in an economical manner, is very ingenious. A flock of Guinea pigs, kept in a hurdle-pen, is every day drawn upon to supply fresh meat at the rate of 2 oz. to every dozen chickens.



WEST INDIA : *Jno. N. Lightbourn's Sons, New York & London.* 10 cents Bi-monthly. Annual subscription 70 cents, post free.

The second number of this attractively produced magazine is well up to the standard set in the first issue. The contents are sufficiently varied to appeal to a large circle of readers, comprising agricultural topics, the British Guiana Indians, the King's coronation, negro philosophy, etc.

In an article on the banana flour industry of Jamaica, Mr. F. C. Sharp disposes of the belief as to the enormous amount of food produced per acre by the banana, and shows it to be much less than yams, sweet potatos, tannias or maize.

Other papers of agricultural interest are those on 'The sisal cleaning company,' 'Cane Farming in Trinidad,' 'Cotton growing in the West Indies,' 'Sweet potatos,' 'Limes,' etc.

The journal is well printed and well illustrated, and we trust it may have a long and prosperous career.

MOSQUITO BRIGADES AND HOW TO ORGANIZE THEM. By Ronald Ross, F.R.S., etc. *London, G. Phillip and Son, 32, Fleet Street, E.C.* Price 3*s*.

This little hand-book is the practical outcome of the work conducted by Major Ross and many others with mosquitos, from the point of view of disease transmission. Everyone is now familiar with the views of modern science of the relation of the mosquito to malaria in human beings, though all do not yet believe it to be true. Few will be aware that the destruction of mosquitos, and thus the reduction of malaria has been reduced to a practical everyday matter, requiring no special skill but merely energy and common sense. To show this is the object of Major Ross' book, which deals very simply and practically with all that concerns mosquitos and their eradication.

The author devotes the first six chapters to the habits of mosquitos, their breeding places and other important points. The next nine treat of the practical steps,—methods of raising funds and organizing gangs, interesting householders and others in the work, and, generally, of carrying on a campaign against mosquitos. A short summary, followed by cautions and comparisons, and some very pungent remarks on sanitary and municipal authorities, closes the book proper. The appendix, forming nearly half of the volume, contains reports of the various mosquito campaigns in different parts of the world.

The book is practical, sensible and well written. There is a common sense tone about it which may appeal more to those who doubt than would a set scientific treatise. Medical men may find useful information in these pages and we would commend it to the attention of those who act on sanitary boards, vestries, etc., or who endeavour to sway public feeling through the press. There is no reason why such mosquito campaigns should not be organized in all West Indian towns, to the great improvement both of public health and comfort, and such work should not be hard if Major Ross' experience were made use of.

THE NATURAL HISTORY OF PLANTS.

We have received from Messrs. Blackie & Sons, Parts 3 and 4 of their reissue of Professor Kerner's delightful work, a general review of which was given on page 203 of this Journal. These two numbers are mainly devoted to the work of leaves. The clever devices of many plants to protect their young and delicate leaves from the sun and wind are well described. Other interesting chapters show how plants arrange their leaves so as to be in the best position for carrying on their functions, and the various methods by which plants protect themselves from attacks of animals. The work can be confidently recommended to all who take an interest in plants, and they will never regret their purchase. The book will be complete in sixteen monthly parts at 1*s*. 6*d*. each.

BIBLIOGRAPHIA JAMAICENSIS. By F. Frank Cundall, F.S.A. *The Institute of Jamaica, Kingston.*

This pamphlet of eighty-three pages, contains, as its subtitle states, 'a list of Jamaica books and pamphlets, magazine articles, newspapers and maps most of which are in the library of the Institute of Jamaica.' The contents are divided into groups. The enumeration of a few of these will show the scope of the volume:—'General Aspects of Jamaica 'History', 'Natural History', 'Law and Politics,' 'Sociology,' 'Folk-lore,' 'Education,' etc. To render the book more generally useful a number of cross references are given.

The list has been restricted to books or articles dealing solely with Jamaica, and contains 1,109 references in all. It should prove of great assistance to all interested in the past and present condition of the Colony.

DEPARTMENT NEWS.

Mr. G. Whitfield Smith, the Travelling Superintendent of the Imperial Department of Agriculture, returned to Barbados by the s.s. *Orinoco* from Trinidad and St. Vincent on November 30. He had been absent from the Head Office since October 2, and as previously arranged had visited the Virgin Islands, Montserrat, Dominica, St. Lucia, Grenada and St. Vincent. In the Virgin Islands and Montserrat Mr. Smith delivered courses of lectures to the teachers of elementary schools, and in addition inspected the Botanic Stations and Agricultural Schools of the Department at each of the islands visited.

Mr. A. H. Kirby, B.A., of St. John's College, Cambridge, Natural Science Honours, formerly Science Master at King Edward VI School, Nuneaton, and at present Science Master at Wellington County School, has been selected for the post of Agricultural and Science Master at the Antigua Grammar School in connexion with the Imperial Department of Agriculture.

GLEANINGS.

As indicative of the extent to which the cultivation of rice in Demerara has affected the importation of the article, it is interesting to note that in 1895 48,348,068 lb. were imported. Since then there has been a steady decrease, the imports for 1901-02 amounting to only 15,213,303 lb.

Hard fully ripe cocoa-nuts are imported from Trinidad into St. Kitt's, where in addition to being used for pastry they are placed in cellars until well sprouted, when they are sold for parlour decorations at 8*d.* to 1*s.* apiece.

It is reported from Montserrat that some canes of the variety B. 147, which had been allowed to 'stand over' from last season at Gages estate, grew to an abnormal length. One of these, dressed ready for the mill, measured 18 feet, and contained fifty-six joints, the longest joint measuring 7 inches. The plot was planted in May 1900 and reaped in November 1902.

If a cocoa-nut were planted in the ground in an upright position, its growth would be retarded because although the roots force a passage between the husk and the shell, coming out at a point of the shell which has been cut off to allow them exit, yet the hard shell would remain immediately under the stem until the former had decayed. Whereas if the nut is planted in the natural position in which it falls, namely, on the side, the roots come out, from the first, clear of the husk and shell.

An Association of the teachers in the Primary Schools has been recently formed at Montserrat. Monthly meetings are held for the discussion of educational topics.

Sponge fishing is an important industry at the Bahamas, and affords employment to between 6,000 and 7,000 persons. During the fifteen months ended in March of this year, over one million pounds weight of sponges were exported, of the value of £91,500. Nearly ninety per cent. of the sponges go to the United States, and the remainder to Great Britain.

The recent rains have slightly checked the picking of the cacao crop in Trinidad, but at the same time they have been very beneficial to the sugar crop.

The Trinidad *Mirror* reports that a want of labour has been felt by the sugar planters, as most of the unindentured labourers have been very busy in the rice fields. A considerable amount of rice is now grown in the Colony, and at this season largely takes up the time of the free coolies.

The area of land under cane cultivation in British Guiana has increased from 67,884 acres in 1900-01, to 72,148 in 1901-02. The increase in the cultivation has been general on all the estates in the colony, one plantation, 'Skeldon,' in Berbice leading with 703 acres more in canes than at the same period last year.

Letter wood or Leopard wood is well known as one of the ornamental woods of the West Indies. Snake wood is another trade name. It is employed for small turnery, walking sticks, cabinet inlaying, etc., and prized on account of its curious markings.

The Gomea of St. Vincent *(Bursera gummifera)* known in Jamaica as the Birch, forms good 'live' telegraph posts. In Antigua it is known as the Turpentine tree and used in a similar way. The timber is employed for coopering, boat building, etc.

It may not be generally known that sugar is employed in the manufacture of transparent soaps. The *Louisiana Planter* states that 150 lb of sugar are necessary for 1,000 lb of soap.

A specimen of the aloe cultivated at Barbados has been determined at the Royal Gardens, Kew, as *Aloe vera*, a native of the Mediterranean region of Europe, and probably introduced to the West Indies in very early times.

During the current year 387,576 lb of balata, yielding a royalty of $7,770.27 were exported from British Guiana. This industry is in a fairly prosperous condition at present, good prices having been obtained for the product.

The revenue from the British Guiana gold industry for the year 1901-02 exceeded that received in 1900-01 by $400.77, the royalty on gold produced being $70,932.54 as against $79,871.46 for last year.

Grenada presents an interesting example of the substitution of one industry for another. The exports of sugar in 1882 were of the value of £21,000; by 1894 they had fallen to £50, and now, the island does not grow enough for its own consumption. The cacao industry has developed whilst sugar has declined, and the exports of cacao in 1900 were worth £270,000.

The Botanic Garden at St. Vincent was established as long ago as 1765. It is the oldest garden in the West Indies and perhaps in any part of the New World. Another old Botanic Institution in the West Indies is the garden at Bath, Jamaica, dating from 1774. The ill-fated garden at St. Pierre, Martinique, was established at about the beginning of the last century.

The output of shingles from Demerara has decreased by 50 per cent. There has been a slight increase in the export of charcoal.

Cane farming is being adopted on several of the large plantations in Demerara, the land being rented to the farmers for this purpose.

EDUCATIONAL.

School Gardens at Trinidad.

The following account of the efforts made in Trinidad to encourage a practical interest in plants by means of School gardens is taken from the Annual Report for 1901-02 of the Inspector of Schools for the Colony :—

Of the 82 schools in operation on March 31, 1902, 67 had taken up Practical Agriculture previous to that date, and out of the 80 schools examined, 30, or 37·5 per cent., presented this subject, the results being in my opinion satisfactory for the first year.

In some schools, notably Mayaro Government, and New Grand, E.C., to which the award of 'Very Good' was given, the subject had been treated in a systematic and intelligent manner, whilst at other schools, notably—Hard Bargain, North Trace, New Grant and Princes Town Government, 5th. Company, 6th. Company and Neckchuddy Road E.C. the work deserves great credit.

My chief object has been to impress upon the teachers that a school garden is not for the purpose of merely growing vegetables, but to be cultivated in such a manner as to impress upon the children by means of experiments the benefits to be derived from *true* Agriculture. I have also recommended teachers to try and induce the parents of children to come and see the results for themselves which will do more, I think, than anything else, to make them believe in the benefits to be derived from the proper training of this most important subject, and cause its more rapid spread and adoption amongst the labouring part of the community ; and this I am glad to say has already commenced, as some of the parents of the children attending 5th. Company, 6th. Company, and Neckchuddy Road E.C. Schools, have been to the teachers asking for information as to the methods used to grow the fine vegetables obtained at these schools.

The chief faults in the school gardens are :—

(1) Overcrowding, and mixing of different plants, which renders 'rotation of crops' impossible.

(2) Planting only with a view to get as much as possible out of the land, without any regard to exhaustion of the soil, and without experiments.

(3) Insufficient use of green manure.

(4) Want of compost heaps.

(5) Insufficient mulching during the drying season.

In order to remedy these mistakes, I am advising the teachers : —

(1) To set aside a plot for each kind of vegetable, and plant at regular distances.

(2) To set aside a portion of each plot for experiments.

(3) To bury in each plot as much as they can of the plant refuse.

(4) To form compost heaps of any surplus vegetable refuse, weeds and grass.

(5) Always to mulch as far as possible in the dry season.

I have been careful to inform teachers that it is not the look of the garden on the day of examination for which the award is given, but for the general work during the year.

On the whole I may say that, I think the outlook for practical agriculture in this district is very promising, and if an instructor could visit the different schools two or three times a year, and take practical work, as well as give lectures, the results would be marked, as I have no doubt that after a time, some of the more intelligent adults would also attend sometimes, more especially if the subjects of the lectures were known beforehand.

I am sorry to say that, the parents of pupils attending Russillac C.M.I. School have refused to allow their children to work in the school garden, and have threatened to take them away if they are compelled to do so. In consequence practical agriculture has ceased to be taught at this school.

SCIENCE NOTES.

Disintegration of Corals.

Dr. J. E. Duerden, A.R.C.S., formerly Curator of the Museum of the Institute of Jamaica, contributes to the *Bulletin of the American Museum of Natural History*, Vol. XV., pp., 323-32, an interesting paper entitled 'Boring-Algae as agents in the disintegration of Corals.' Since 1854 it has been known that the hard, calcareous parts of corals are often penetrated in all directions by tubules, due to the growth of filamentous plants. On dissolving a piece of coral so attacked, in acid, a fluffy mass remains consisting mainly of algae, in a living active condition. These coral boring algae the author regards as playing 'an important if not the most important part in the disintegration of coral masses.'

New Method of Treating Starch.

The *Botanical Gazette* for July 1902, records that 'as a result of a series of experiments begun at Clemson College in 1901, and brought to a successful completion in the laboratories of the New York Botanical Garden, Dr. Alex. P. Anderson has developed a method by which, with the application of heat to starch grains and to air-dry starch in many forms, the granules or particles are expanded many times their original dimensions, being fractured into innumerable fragments during the process. As a result of this treatment a grain of rice is expanded to eight or more times its original volume, while still retaining its original form. Other cereals exhibit similar behaviour. The process is applicable to nearly all starchy seeds and starchy substances, greatly increasing their nutritive availability. The products obtained are pleasant to the taste, and the process may be varied to produce a great variety of flavours with any given cereal. Furthermore, the material prepared in this manner is absolutely sterilized and may be preserved or stored for long periods. The approval the products have met from food and chemical experts suggests that the process may prove of great economic and commercial value.'

'Ether' and 'Nitrogen-free' Extracts.

'Ether extract' is an expression commonly used in giving the results of analyses of food stuffs, etc. It denotes the material taken up by ether from the substance after the water has been removed, and for all general purposes may be taken as 'fat.'

Another term frequently met with is 'Nitrogen-free extract.' Under this head are included starch, sugar, gums, etc. The proportion of nitrogen-free extract is very important in all feeding stuffs, especially corn, meals, etc.

GRENADA: REPORT ON THE BOTANIC STATION, 1901. By Mr. W. E. Broadway, Curator.

Amongst the more important new works undertaken during the year, a retaining wall was erected along the bank of a ravine near the Office, and a new road laid out by the upper boundary of the Station.

Useful work has been done in the distribution of economic plants, nearly 9,000 being sent out during the year.

Small plots of limes and alfalfa were established during the year, and the other experiment plots continue to make satisfactory progress.

The rainfall for the year was normal and totalled 92·15 inches.

TRINIDAD: ANNUAL REPORT ON ELEMENTARY EDUCATION, 1901-02. By Mr. R. Gervase Bushe, M.A., Inspector of Schools.

Amongst the items of agricultural interest dealt with in this report, Mr. Bushe states that since the inauguration, in 1899, of lectures to teachers, 188 teachers in Trindad and Tobago have availed themselves of the opportunities offered to attend the courses of instruction by Professor Carmody and Mr. J. H. Hart. Practical instruction in agriculture is making gratifying progress in the colony, and up to March last no less than 149 schools had commenced school gardens. Of these seventy-eight were sufficiently good at the time of the annual examination to secure a bonus. Forty schools contributed to the show of vegetables grown in school gardens, held at Port-of-Spain in January, and offered a sufficient demonstration of 'the evident interest that had been aroused by the introduction of agriculture as a subject of instruction in our elementary schools.'

A more detailed account of some of the school garden work is given on page 269 of this number.

CUBA: TRADE OF FOR 1901. Diplomatic and Consular Reports, No. 2909, Foreign Office, October 1902.

It will be of interest to agriculturists in the British West Indies to note that his Majesty's Minister at Havana reports that 'the production of sugar is on the increase: improvements are being introduced in the cultivation of tobacco: considerable activity is observable in the minor agricultural industries, such as the raising of fruit and vegetables, and in the exploitation of the valuable cabinet woods with which the forests abound.'

The total amount of rice imported was 1,741,552 cwt., valued at £758,421; of this 1,717,175 cwt. came from British India, only 934 cwt. from the United States, and 23,385 from Valencia in Spain.

Sugar to the value of £6,167,042, molasses £243,366 and rum £41,308 were exported, the total value thus being £6,451,716, as against £3,520,768 in 1900. The quantity of sugar exported was 589,281 tons, as against 286,996, tons in 1900.

Tobacco, cigars and cigarettes were exported to the value of £5,065,435, as against £5,217,594 in 1900. Fruits amounted to £199,949 (£145,956 in 1900), cacao to £78,735, (£79,826 in 1900), honey and wax to £91,947 (£83,715 in 1900), woods (chiefly mahogany) to £237,903 (£209,941 in 1900). The fruits comprise bananas, pine-apples and cocoa-nuts and were all exported to the United States.

The development of the island's resources is expected to be greatly furthered by the construction of the new railway to Santiago de Cuba, which is now nearly completed.

VOLCANIC DUST.

Analysis of the Dust of October 16 at Barbados.

The chemical analysis, by Mr. R. Radclyffe Hall, B.A., Acting Professor of Chemistry, Barbados, of a sample of the volcanic dust which fell at Barbados on October 16, has given the following results. For analyses of the dust of May 7-8, see page 88 of the *Agricultural News*:—

The complete mineral contained in 100 parts:—

Moisture	0·520
Loss on ignition	0·130
Potassium oxide (potash) ...	0·753
Sodium oxide	3·979
Calcium oxide (lime) ...	9·409
Magnesia	3·594
Manganese oxide	0·150
Alumina and Titanium oxide ...	20·134
Iron oxide	9·596
Phosphoric anhydride (phosphoric acid)	0·449
Sulphuric anhydride ...	0·148
Silica (by difference) ...	51·138
	100·000

Of the above the following percentages were soluble in Hydrochloric acid:—

Potassium oxide (potash) ...	·087
Sodium oxide	·627
Calcium oxide (lime) ...	3·200
Magnesia	1·284
Ferrous oxide	1·410
Ferric oxide, Alumina and Titanium oxide	8·666
Phosphoric anhydride (phosphoric acid)	·061
Sulphuric anhydride	·148
Silica	1·138
Soluble in Citric acid solution, 1 per cent.	·027
" " " " " " " "	·028

Cleaning Tomato Seed. The *Gardeners' Chronicle* describes a method of cleaning tomato seed which seems simple and practical. The pulp, being scooped out, is placed in a sieve, the mesh of which does not allow the seeds to pass through. The sieve is then placed in water and the pulp is rubbed through the mesh of the sieve by means of the hand. In a short time, the pulp being all rubbed away, the seed remains perfectly freed from it. Melon and similar seeds may be cleaned in the same way.

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—November 11, 1902.—Messrs. J. Hales Caird & Co., Messrs. Gillespie Bros. & Co. and 'The Public Ledger,' November 8, 1902.

Aloes—Curaçoa, 10/- to 40/-; Barbados 13/- to 35/- per cwt.
Arrowroot—St. Vincent, 3*d*. to 5¾*d*. per lb.
Balata—Demerara sheet, 2/0½ to 2/6 per lb.
Bees-wax—Jamaica, fair to good pale £7 5*s*. to £7 15*s*. per cwt. In good demand.
Cacao—T'dad, 58/- to 85/- per cwt. ; Dominica 56/- to 57/- per cwt.; Grenada, common to fine 56/- to 62/- per cwt. ; Jamaica, 54/- to 63/6 per cwt. Market steady.
Cardamoms—Mysore, 1/4 to 4/- per lb.
Coffee—Jamaica, 37/- to 125/- per cwt. Costa Rica, 42/- to 99/- per cwt. ; Peaberry 75/- to 115/- per cwt.
Cotton— West Indian 4$\frac{11}{16}$ to 5$\frac{5}{16}$*d*. per lb.
Fustic—£3 10*s*. to £4 5*s*. per ton. In moderate demand.
Ginger—Jamaica, common to fine 35/6 to 50/- per cwt.
Honey—Jamaica 14/- to 23/- per cwt.
Kola Nuts—1*d*. to 4*d*. per lb.
Lime Juice—Raw, 10*d*. to 11*d*. per gallon ; concentrated, £11 10*s*. per pipe.
Logwood—Jamaica, £4 2*s*. 6*d*. to £4 7*s*. 6*d*. per ton.
Mace—1/2 to 2/10 per lb.
Nitrate of Soda—Agricultural £9 5*s*. per ton.
Nutmegs—90's to 60's @ 1/1 to 2/7, 132's to 95's @ 7*d*. to 1*s*. per lb.
Pimento—2¼*d*. to 2¾*d*. per lb.
Rum—Demerara 8*d*. to 10½*d*., Jamaica 1/7 to 2/7 per proof gallon.
Sugar—Barbados Muscovado, 12/- to 13/- per cwt.
Jamaica Muscovado 10/6 to 13/6 per cwt.
Trinidad and Demerara 9/- to 15/9 per cwt. duty paid.
Sulphate of Ammonia—£11 12*s*. 6*d*. per ton.
Tamarinds—Barbados 12/- to 15/6 per cwt.
Fruit—Covent Garden Market ('Gardener's Chronicle,' November 8, 1902.)
Bananas—7/- to 10/- per bunch.
Oranges—8/- to 17/6 per case.
Pines—3/- to 4/- each.

New York,—November 14, 1902.—Messrs. Gillespie Bros. & Co.

Bananas—Jamaica firsts, 90*c*. to 95*c*. ; eight to seven hands, 65c.
Cacao—African, 13¼c. to 13⅜c.; Caracas, 13¾c. to 14¼c. ; Jamaica, 11½ to 11¾c., ; Grenada, 13½c. ; Trinidad 13c. to 14c. per lb.
Cocoa-nuts—Small Trinidads $11.00, no demand; Jamaicas $21.00 to $22.50 per M.
Coffee—Rio, good ordinary 5⅛c. to 5¼c. ; Jamaica, fair to good ordinary 6c. to 7c. per lb. ; Manchester grades 8½c. to 10½c. per lb.
Grape Fruit—$3.00 to $7.00 per barrel.
Oranges—Jamaica, $4.75 to $5.50 per barrel.
Pimento—4⅜c.to 4$\frac{11}{16}$c. per lb.
Rubber—Nicaragua scrap 55c. to 55½c. per lb ; Guayaquil strip 52¾c. per lb.
Sugar—Muscovado, 89°, 3$\frac{3}{16}$c. per lb.; Centrifugals, 96°, 3$\frac{5}{32}$c.; molasses, 89°, 2$\frac{5}{16}$c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—November 18, 1902.—Messrs. G. W. Bennett Bryson & Co., Ltd.

Molasses—Market closed.
Sugar—Muscovado $1.37½ per 100 lb.

Barbados,—November 22, 1902.–Messrs. T. S. Garraway & Co., and Messrs. James A. Lynch & Co.

Arrowroot—St. Vincent, $4.00 per 100 lb.
Cacao—$12.50 to $13.00 per 100 lb.
Coffee—Jamaica and ordinary Rio $8.50 to $9.50 per 100 lb. respectively.
Hay—New Brunswick 80c. to $1.00 per 100 lb.
Manures—Nitrate of Soda $60.00 to $65.00 ; Ohlendorff's Dissolved Guano $60.00; Sulphate of Ammonia $75.00 to $80.00; Sulphate of Potash $70.00 per ton.
Molasses—No quotations.
Onions—Madeira $2.75 to $3.00 per 100 lb.
Potatos—$1.75 to $2.16 per 160 lb.
Rice—Ballam $4.50 per bag (190 lb.) ; Patna $3.50 per (100 lb.) ; Seeta $3.50 per (100 lb.)
Sugar—$2.40 per 100 lb.

British Guiana,—November 19, 1902.—Messrs. Weiting & Richter.

Arrowroot—$9.00 per barrel.
Balata—40c. to 42c. per lb.
Cacao—native 11c. to 13c. sales per lb.
Cassava Starch—$7.00 to $7.50 sales.
Cocoa-nuts—$8.00 to $10.00 per M.
Coffee—Rio and Jamaica 11½c. to 12c. per lb. (retail.)
—Creole, 11c. to 12c. per lb.
Eddoes—$1.92 per barrel.
Onions—Retail 3c. to 3½c ; Garlic 8c. per lb. Wanted.
Pea Nuts—Curaçoa 3¾c. ; American 5c. per lb. (retail.)
Plantains—20c. to 36c. per bunch.
Potatos English—$2.75 to $3.00 per barrel.
Rice—Ballam $4.75 to $4.80, ex store ; Patna $5.50 to $5.60 per bag ; Seeta $5.70 to $5.80
—Creole Rice 20c. per gallon, (retail.)
Sweet Potatos—Barbados $1.08, Creole $1.00 per barrel.
Tannias—$1.92 per bag.
Yams—$2.64 per bag.
Molasses—Vacuum Pan, yellow, 15c. to 16c. per gallon, casks included.
Sugar—White $3.50 to $4.00; Dark Crystals $1.85 to $1.91½ ; Yellow $2.10 to $2.25.; Molasses $1.40 to $1.60 (nominal) per cwt.
Timber—Greenheart 32c. to 55c. per cubic foot.
Wallaba Shingles—$3.00 to $5.00 per M.

Trinidad,—November 20, 1902.—Messrs. Gordon, Grant & Co., and Messrs. Edgar Tripp & Co., November 21, 1902.

Cacao—Ordinary to good red $12.75 to $13.00 ; estates, $13.75 per Fanega.
Balata—Venezuelan 42c. to 43c. per lb.
Coffee—Venezuelan. No quotation.
Onions—$2.25 to $3.50 per 100 lb.
Potatos English—$1.35 to $1.70 per 100 lb.
Rice—Yellow $4.50 to $4.75 ; White Table $5.25 to $5.75 per bag.
Sugar—For Grocery use, $1.70 to $3.50 per 100lb.

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London: Messrs. Dulau & Co., 37, Soho Square, W. *Barbados:* Messrs. Bowen & Sons, Bridgetown. *Jamaica:* The Educational Supply Company, 16, King St., Kingston. *British Guiana:* The 'Daily Chronicle Office, Georgetown. *Trinidad:* Messrs. Munro, & Co., Frederick St, Port-of-Spain. *Tobago:* Mr. C. L. Plagemann, Scarborough. *Grenada:* Messrs. F. Marrast & Co., 'The Stores,' St. George. *St. Vincent:* Mr. W. C. D. Proudfoot, Kingstown. *St. Lucia:* Mr. R. G. McHugh, Castries, *Dominica:* Messrs. C. F. Duverney & Co., Market St. Roseau. *Montserrat:* Mr. W. Llewellyn Wall, Plymouth: *Antigua:* Mr. F. Forrest, St. John's. *St. Kitts:* Messrs. S. L. Horsford & Co., Basseterre. *Nevis:* S. D. Malone, Charlestown.

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Cotton in the West Indies.

IN the West Indies, as in Africa and elsewhere, considerable interest is being taken at the present time in cotton, and efforts are being made, or are soon likely to be made, to extend its cultivation. The establishment of a cotton industry in these Colonies does not mean the introduction of an entirely new plant, with all the accompanying doubts as to its suitability to West Indian circumstances. Cotton may yet be called a West Indian industry, albeit shrunken to such small proportions that it exists on a commercial scale only in the little island of Carriacou.

Cotton has long been identified with the West Indies and at one time these Colonies supplied over 70 per cent. of the cotton used in Great Britain. The older books on the West Indies contain numerous references to the cotton plant and its cultivation. According to Sir Hans Sloane, 'it appears that it was found manufactured for cloathing by the Indians, when Columbus first discovered the West Indies.' (*History of Jamaica*, Vol. II, p. 71). Ligon in his *History of Barbados*, published in 1657, notes that on one estate of 500 acres in the island only 200 acres were cultivated in sugar, and the remainder devoted to wood, pasture, provisions, tobacco, together with 'five acres for ginger and as many for cotton wool.'

In Jamaica, cotton was an important plant early in the Eighteenth Century and, to quote Sir Hans Sloane again, 'cotton is one of the wealthy West Indian commidities.' He also records that it was to be found in St. Lucia and Guiana. In Trinidad too cotton was grown. 'A few individuals made their fortunes by its growth and exportation. This cultivation, however, was afterwards abandoned for the more lucrative production of sugar.' (De Verteuil's *Trinidad*, p. 252).

The days of 'the more lucrative production of sugar' would appear to have passed away, and it is not improbable but that cotton may once more take its place amongst the staple products of the West Indies.

Little information is to hand as to the yield per acre obtained in the West Indies in the days when cotton was a staple product. Long in his *History of Jamaica*, published in 1774, gives the following return for an estate in that Colony. The plants were sown 5 feet apart. Two crops were obtained within a year; the first, eight months after sowing, the second, four months later. From 20 acres, Long sets the yield of cotton at 6,000 lb. for the first crop and 3,000 lb. for the second; a total of 9,000 lb. or 450 lb. per acre. He adds that 'in the Parish of Vere, 240 lb. per acre is reckoned a tolerably good yielding.'

In the United States between 250 lb. and 300 lb. of cotton per acre has been the average crop for the last fifteen years. Descriptions have already been given in the *Agricultural News* of the results obtained during the last two years on experiment plots in the Leeward Islands (see pages 153, 169, etc.)

In some small scale experiments recently made at Montserrat no less than 2,800 lb. of seed cotton, equal to over 900 lb. of lint per acre, were obtained from a plot of Sea Island cotton. A plot of one quarter acre of mixed varieties yielded 3,429 lb. of seed cotton, or at the rate of about 1,100 lb. of lint per acre. Returns of this order are stated to be commonly obtained in Cuba.

These figures must for the time be accepted with caution and need to be put to the test of experiments on a commercial scale. Even however at the much lower average of 300 lb. of lint per acre, obtained in the United States, and also in Carriacou there is reason to believe that cotton will prove a remunerative crop in the West Indies.

To illustrate the actual efforts being made to reintroduce cotton into these islands we may mention that in St. Kitt's there are now some 230 acres under cotton. Montserrat follows with 160. In St. Lucia, 4 acres are devoted to cotton at the Experiment Station, and the industry is extending throughout the island. To encourage the cultivation the Agricultural Society are offering prizes at their forthcoming Show. In Antigua also cotton is now cultivated to an appreciable extent.

SUGAR INDUSTRY.

West India Sugar in Canada.

The following interesting notes on the importations of West India sugars into Canada are taken from the *Maritime Merchant* of November 20:—

'The importations of West India sugars into Halifax have been much larger this year than ever before,' said Mr. G. McG. Mitchell of G. P. Mitchell & Sons. 'I have not the complete figures for the year at hand, but there was landed here during the months of April, May and June, 8,000 tons of West India cane sugar, and the total importations for the year will not be far short of 20,000 tons. The year before only 5,000 tons were imported. The bulk of this goes to the refineries, but a small percentage is sold to the grocery trade in the state in which it is received. The Montreal refineries take about two-thirds. The increase has had the effect of decreasing the importations of beet root. Formerly the refineries consumed a very large proportion of foreign beet root, but this year the percentages have been reversed. In 1898 the importations of beet root amounted to 19,000 tons; in 1899 to 18,000 tons, and in 1901 to 25,000 tons. For 1902 the consumption of beet root by our refineries will be much lighter.

'For the last five or six years we have been working up the trade in West India sugars. The preferential duty has helped some, but the difficulty has been to persuade the West India exporter that he could do as well by shipping to Halifax as to New York. As a matter of fact, he can do better. We guarantee to pay the same price that rules in New York on the date that the ship arrives here. This gives the West India merchant who ships to Halifax the advantage of the lighter expenses and charges which obtain at this port. The steamer here goes direct to the refinery and there are no costs for lighterage. It is likely the importation of West India sugars will continue to increase. The abolition of the bounties in foreign beet root countries next September will necessitate the addition of a like amount upon the cost to the consumers. The strong position of raw sugar at the present time is due to this expectation.'

A Prussian Beet Sugar Factory.

The following account of the earnings of a beet sugar factory is taken from a letter in the *Louisiana Planter* for November 8, 1902:—

Recently the large sugar factory of Culmsee, in Western Prussia, has published its annual report. The factory had for the campaign of 1901-02 planted an area of 6,092 hectares, as against 5,106 hectares in 1900-01. The large increase is in some measure due to the hopelessly damaged winter cereals, so that many fields of wheat, rye, etc., had to be turned over and sown with beets. The crop taken from the above area amounted to 179,714 long tons of beet, as against 117,081 tons for the preceding campaign. The season lasted from September 24 to December 14, and there has been an average working of beets in 24 hours of 2,420 tons, as against 2,318 tons last year. The contents of sugar

was 14·86 per cent. as against 16·71 per cent. in 1900-01. The sugar turned out amounted to 23,957 tons or 13·51 per cent. of the weight of the beet. The financial result has been, after writings off of 156,163 marks, a net profit of 227,500 marks, of which the shareholders received a dividend of 17½ per cent. as against 20 per cent. a year ago.

ST. LUCIA.

Agricultural Notes.

Mr. Geo. S. Hudson, the Agricultural Instructor has contributed the following notes :—

Weather.—The rainfall for November in the cacao districts averaged about 18 inches. Such weather makes planters reflect on the advantages of an artificial cacao drying apparatus. It would be of great value to learn what fuel, or how much, is used in the hot-chamber of the cacao drier at the Dominica Botanic Station.

Cacao.—The cacao crop in St. Lucia, though backward, is satisfactory on the whole, most estates hoping to do better than last year.

There has been the usual recurrence of 'thrips' associated with 'Diplodia' attacking branches and leaves, this wet season, on cacao estates on light soils and in less humid climates; but in cases where high cultivation is practised, the attack seems to become feebler every year: it usually commences in September, the foliage becoming small, sparse and yellow, and the higher branches dying away. From May to August such trees as survive recover their vitality. The actual mortality in a badly attacked plantation is about 2 per cent. per annum, but the remainder of the trees yield little or no crop. Nitrate of soda at the rate of 1 cwt. per acre is an excellent stimulant in such cases, and forking, draining and, in some cases, lime, are also necessary, combined with frequent and clean weeding. Thrips, unassociated with 'Diplodia,' when attacking young cacao plants with limited foliage, frequently kill them. This may be cheaply and easily dealt with by spraying, when only small plants are in question, at a cost of 2*s.* to 3*s.* per acre.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following forms the second contribution on this subject from the pen of Mr. John R. Jackson, A.L.S. His former article will be found on page 226.

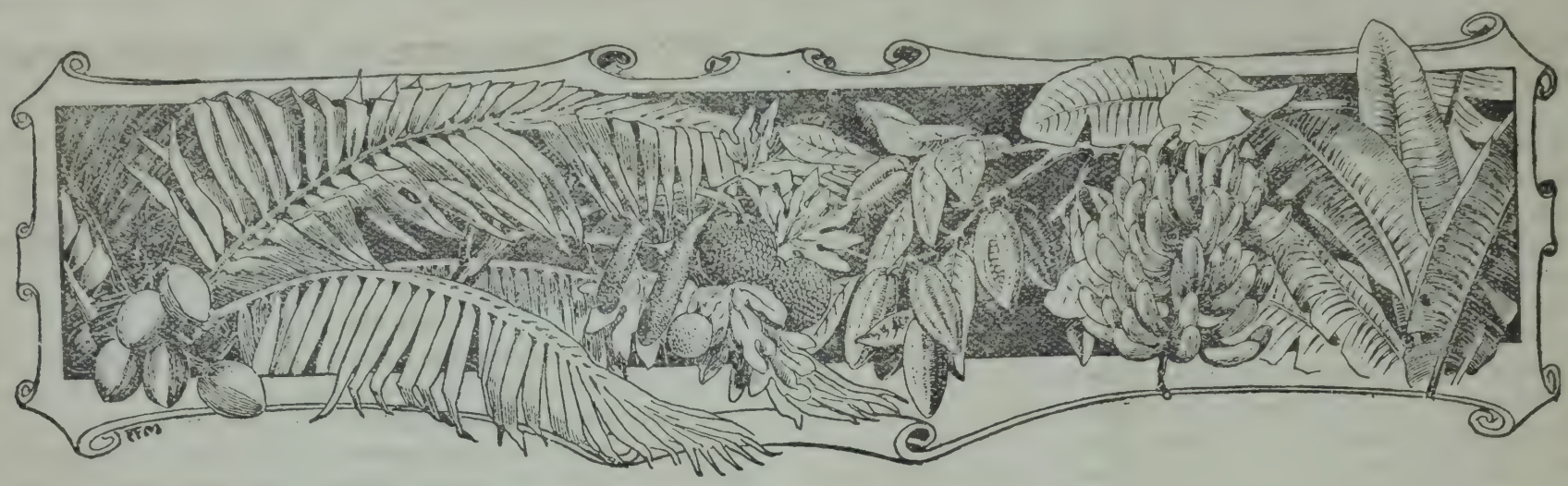
Though business generally in Mincing Lane during the month of October was reported to be of a fluctuating nature, there were points in the drug market that raised some interest. At the beginning of the month though quietness reigned in the drug trade, the fact was noted, that over a thousand packages of crude drugs were delivered from the warehouses during September, which included 100 packages of Ipecacuanha. At the end of October a decided all-round improvement in business was reported, several products claiming special attention, amongst them being peppermint oils, which in the course of a week advanced about 6*s.* per lb. bringing the price of the best brand up to 18*s.* 6*d.* to 19*s.* per lb., while Japanese dementholated oil rose 4*s.* per lb., the quotations being from 10*s.* to 10*s.* 3*d.* per lb.

For some time past there has been considerable anxiety with regard to the supply of Buchu leaves and Senega root. The first are furnished by three rutaceous shrubs—*Barosma betulina*, *B. crenulata* and *B. serratifolia*, all natives of the Cape of Good Hope. The dried leaves are used as a stimulant and tonic, and in chronic diseases of the bladder. The supply has become so short that as much as 1*s.* 6*d.* per lb. has been paid for fair green leaf which has been referred to as 'famine price.' Senega is the root of *Polygala Senega*, a North American plant belonging to the Polygalaceae. It is commonly known as a snake root in consequence of its former reputation for the cure of snake bites. At the present time it is extensively used in medicine as a stimulant and expectorant, especially in chronic bronchitis. The following extract from a circular recently issued by the London branch of an American house, with reference to the future prospects of Senega root, will be of some interest :—

'The market is practically bare, and the demand active. In spite of the extreme prices offered diggers, there is no evidence that there is any amount of root coming forward, and the season is now drawing to a close. Our shipments have not been over 26 per cent. of the average. Minnesota and Dakotas are no longer a factor, as the land is now taken up for agricultural purposes, and the same movement is progressing rapidly in the Canadian North West. The prospects are therefore for greatly reduced shipments of this article in the future.' In the early part of October the prices ranged from 2*s.* 10½*d.* to 3*s.* per lb., business being much quickened by a tender appearing on behalf of the Indian Government for 3,000 lb. At the end of the month 3*s.* was the prevailing price.

Though none of the drugs here mentioned are of West Indian produce, a reference to them may not be out of place, as indicating that there are many products the cultivation of which might well be extended. With regard to the demand and market value of West Indian drugs, we note that at the beginning of the month a bag of dark natural kola sold without reserve at 2¼*d.* per lb., a case of small natural at 2½*d.*, and a half-barrel of fresh at 1*d.* per lb. A fortnight later this article stood as follows :— For good bright washed sound West Indian 4½*d.* per lb. was asked, a bid of 3½*d.* being refused; and for a similar parcel in another catalogue 3¾*d.* was submitted. At the commencement of the month grey Jamaica sarsaparilla was in small supply, 1*s.* 3*d.* per lb. being paid for sound, and 1*s.* 2*d.* for slightly damaged. For five bales of native red at the same sale 8½*d.* to 9½*d.* was paid, and 7½*d.* for country damaged. At the end of the month the prices slightly advanced, 1*s.* 4*d.* being asked for grey Jamaica, while Lima Jamaica was unobtainable. The business done in arrowroot has been quiet. At the commencement of October St. Vincent was bought in at 2½*d.* per lb.; a fortnight later the prices had increased, and fine St. Vincent in tins was bought in at 5½*d.*; for good quality in barrels, bids of 3*d.* to 3⅜*d.* per lb. were made, and ordinary quality was partly sold at 2½*d.* At the end of the month a small lot of St. Vincent was sold at 3*d.* per lb. Good Jamaica ginger has been in fair demand at steady to dearer rates for common. At the sale in the middle of the month 200 packages were offered and 150 barrels sold at the following rates :— Low middling to middling 39*s.* 6*d.* to 42*s.*; ordinary to good ordinary 38*s.* to 38*s.* 6*d.*, and common to good common 36*s.* to 37*s.* 6*d.* per cwt. Forty-two cases and fifty bags of Cochin were also offered at the same sale and seven cases sold, bold roughly cut and scraped and mouldy at 80*s.*; medium at 58*s.* 6*d.*, and small heavily limed at 47*s.*

At the last sale of the month nine packages of musk seed of fair quality from St. Vincent were offered, one of which sold at the high price of 1*s.* 4*d.* per lb.



WEST INDIAN FRUIT.

VANILLA AT DOMINICA.

A good crop of vanilla pods is now being reaped from the vanilla vines growing at the Botanic Station. These are sent to the Agricultural School where the boys are taught to cure the pods under the supervision of the Officer-in-charge. Last year, in curing, each pod was wrapped with thread to prevent splitting and afterwards slowly dried by sun heat. This year the pods are being dipped in hot water of the temperature recommended by Seychelles planters, and the usual after-treatment is being followed. The dipping process is very effective in preventing the vanilla from splitting. There is no doubt that those who are experimenting with vanilla in the West Indies would do well to closely follow the Seychelles methods, already published in the *Agricultural News*, (page 67 *et seq.)* in cultivating the vine, in fertilizing the flowers and curing the pods.

AGRICULTURAL RESOURCES OF BRITISH HONDURAS.

The recently issued *Colonial Report* on British Honduras for 1901 contains the following summary of the present condition of agriculture in the colony:—

The resources of this colony are so considerable that it is marvellous that much greater development has not taken place than is shown by the returns. At least four rivers could be made navigable for light draught steamers for considerable distances inland, and a dozen for canoes or doreys. The Hondo, New River, and Sarstoon are already being used to some extent for navigation by moderately large craft, but their utility might be increased. Mahogany, logwood, vanilla, cacao, rubber (*Castilloa elastica*), sapodilla (from which 'chicle' or chewing gum is prepared), and pimento or allspice are indigenous, and pine-trees and various hardwoods are present in great abundance. The soil in many large areas is peculiarly suitable for the growth of the sugar cane, and factories of very large size could be established if capital were forthcoming. Bananas, oranges, pine-apple, rice and maize are only a few of the products which grow luxuriantly. The bounteousness of nature seems to have made existence so easy in the past that the inhabitants have not been spurred to exertion by necessity, and have lived almost solely by cutting mahogany and logwood, found in the forests, which are then floated down the rivers. Attempts have been made within recent years to cultivate bananas, but cultivation is hampered by want of agricultural knowledge on the part of the land owners and the difficulty of obtaining labourers accustomed to any other kind of labour than that of wood-cutting. The cultivation of cacao is being attempted, but has not yet expanded to any considerable extent. Before agriculture can be expected to become a thriving industry, it will be necessary to facilitate transport by improving the navigation of the rivers and by making good cart roads or tramways leading to the rivers on the sea coast; this is especially necessary in the case of banana cultivation, the fruit being perishable and needing great care in handling. Communication by telegraph or telephone will also be necessary if a thriving business, is to be carried on. No use is at present being made of the vanilla, pimento, or lumber (other than mahogany, cedar and logwood). Vanilla grows so luxuriantly that frequently when riding along the roads through the forests the rider has to lop off the overhanging vines with his machete in order to secure free passage. There seems good reason to believe that a lucrative industry could be established in the production of the bean if attention were paid to the matter. Another natural product of the forest at present almost entirely wasted is the cohune nut which yields the finest oil for table and other purposes, while the refuse might be suitable for food for stock. Immense quantities at present go to waste.

YARAQUE, A PRODUCT OF CASSAVA.

In the *Geographical Journal* for September 1902, is published a paper by Mr. E. André entitled 'The Caura Affluent of the Orinoco', giving an interesting account of Mr. André's recent journey up the Caura river and the habits and occupations of the inhabitants of the surrounding villages. Among the economic plants cultivated in these regions is the cassava *(Manihot utilissima)* from which cassava cakes and a fermented drink called *Yaraqué* are

prepared by the Indians. Mr. André thus describes the preparation of *Yaraqué*:—

Yaraqué is the fermented drink made from the cassava, and it is known under different names all over Guiana. Ordinarily, *Yaraqué* is prepared only in sufficient quantities every three or four days to meet the requirements of the household. Banana leaves are placed on the ground in a corner of the hut, and upon these leaves the cassava, thoroughly damped with water, is spread in layers. On each layer a powder of a sage-green colour is sprinkled. This powder is called yaraquéro, and is prepared from the leaves of a plant of the same name *(Trema micrantha)*. The preparation of this powder is simple. The leaves having been dried on the large slab, used for baking cassava, an operation which does not take long, are then reduced to powder by being rubbed between the hands. This powder is kept in well-stopped gourds, as there is a minute red ant which is very fond of it, and will find it out wherever it may be hidden. The mass of damp cassava and *yaraquéro* is then covered over with banana leaves and allowed to ferment. At the end of two or three days the mass becomes slightly sour. In this state it is either eaten or drunk mixed with water and cane-juice. If allowed to ferment for more than three days, it becomes intoxicating. Large quantities of *yaraqué* are consumed during the dances which form part of almost every celebration among the Indians. On these occasions the stuff is prepared on a big scale, generally in dug-outs.

COMPOSITION OF INDIAN CORN.

HUSKED VERSUS UNHUSKED CORN.

The two following analyses of samples of Indian corn, grown in Barbados, have been furnished by Mr. R. Radclyffe Hall, Acting Island Professor of Chemistry, Barbados. The first column gives the percentage composition of the husked corn, whilst the figures in the second column refer to the product obtained by grinding up corn and cob together, often spoken of as 'corn and cob meal':—

	Husked corn.	Unhusked corn (corn and cob).
Moisture	12·43	13·15
Oil	4·83	2·90
Albuminoids	11·81	9·63
Mucilage, starch, etc.	67·61	66·75
Indigestible fibre	1·70	5·92
Ash...	1·62	1·65
	100·00	100·00

The general result of experiments in various parts of the world goes to show that it is advantageous to crush corn and cob together for feeding purposes. It is true that the cob alone has only a comparatively low feeding value. Dr. Henry in *Feeds and Feeding* page 22, says 'it has been suggested that pure corn meal lies heavy in the animal's stomach, and while in this condition is not so readily attacked by the juices of digestion. On the other hand, the particles of cob when associated with the meal corn, cause the mass to be loose in the stomach in condition for easy digestion.'

MINOR INDUSTRIES AT BARBADOS.

The following extract from the *Colonial Report on Barbados* for 1901-02 (No. 368) gives interesting information with regard to the arrowroot industry of the colony. Although cacao, nutmegs and spices are found in the island, the general conditions are adverse to their profitable cultivation on any large scale.

ARROWROOT.

Foremost among the minor industries, apart from the island sea fisheries, and what are known as 'catch crops' on sugar estates, may be placed the cultivation of arrowroot. This cultivation is almost entirely confined to the parishes of St. Joseph and St. Andrew (there being only about 1 acre in St. John's parish), and in the first two parishes principally on the lands sloping towards the sea. On these lands, swept as they are by the sea breezes, it appears to be possible to cultivate arrowroot with success.

About 336 acres are under arrowroot cultivation as follows:—

Parish.	*Acres.*
St. Andrew's	273
St. Joseph's	62
St. John's	1

The industry is at present entirely in the hands of the peasants who carry on the cultivation in small plots, the largest being three acres in extent on Cambridge plantation in the parish of St. Andrew.

It is difficult to arrive at the number of persons who are engaged in the industry because of the smallness of the plots, and because it is carried on by labourers in their spare moments —early in the morning before going to work in the sugar plantations and during the evening after their return. But assuming that each labourer worked four days per week, that is 208 days per annum, continuous occupation would be afforded to 162 persons. As a matter of fact, however, as many as 700 persons must be engaged in arrowroot cultivation, most of them as already stated, during their spare time.

The greater part of the arrowroot made in Barbados is sold in the country districts by what are locally known as 'starch sellers.' These sellers are either the producers themselves or are persons who buy the arrowroot and retail it. The annual yield is about 2,700 barrels, and the value, at the low price of 9*s.* per 100 lb., about £5,000.

Most of the imported arrowroot comes from St. Vincent and is sold in Bridgetown. As there is an import duty of 2*s.* 6*d.* per 100 lb., to which must be added the cost of freight and the middleman's commission, there is still room for the local expansion of the island product apart from the possibility of making it an article of export. Before exportation can take place there must be considerable improvement in manufacture by the erection of suitable factories provided with modern appliances.

CACAO.

There are a few cacao trees here and there, but judging from their appearance it is unlikely that cacao growing can ever assume any importance in Barbados. Both soil and climate appear to be unsuitable.

NUTMEGS AND SPICES.

I have seen nutmeg trees growing well in gullies and ravines but there is no systematic cultivation, and it is doubtful whether suitable areas, sufficiently large, could be obtained to admit of cultivation being conducted on a commercial scale.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming should be addressed to the **Commissioner, Imperial Department of Agriculture, Barbados.**

It is particularly requested that no letters be addressed to any member of the staff by name Such a course may entail delay.

Communications should always be written on one side of the paper only. It should be understood that no contributions or specimens will, in any case, be returned.

All application for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department. A complete list of the London and Local agents will be found on page 287 of this number.

Correspondents sending newspapers should be careful to mark the paragraphs they wish to bring under notice.

Agricultural News

Vol. I. SATURDAY, DECEMBER 20, 1902. No. 18.

NOTES AND COMMENTS.

Trial Shipment of Bananas from Dominica.

Recently a small shipment of six bunches of bananas was made to London per Royal Mail Steamer. The object of this experiment was to test the system of packing adopted in the Canary Islands, in which the bunch of bananas, cut at the right stage, is carefully wrapped in a thin layer of cotton wool, in turn is covered with paper, and lightly tied to keep both the wool and paper in place. The bunch is then carefully laid in the crate and held in position, to prevent bruising, by perfectly dry banana trash. The bunches in question arrived in London in perfect order and realized 7*s.* 6*d.* a piece, and at a time when the banana trade was reported at a low ebb on account of heavy arrivals. The brokers write as follows:—

'We are very pleased to be able to report that the condition and packing left nothing to be desired, and we are satisfied that if the fruit can be brought in a like condition there need be no fear for the results.'

An account of a similar trial shipment of bananas from Barbados was published in the *Agricultural News*, page 68.

Jamaica Horse Show.

On page 167 of the *Agricultural News* attention was drawn to the Jamaica Horse Show which it is proposed to hold near Kingston on February 11 and 12 of next year.

The excellent qualities of Jamaica horses are well known throughout the West Indies, and it is essential that every effort should be made to maintain and improve the breed. A Show must certainly be placed amongst the best possible means of doing this. The bringing together of a typical collection of Jamaica horses will enable breeders to see the weak points and defects in the stock now being produced, and stimulate them to set to work to rear improved animals. Ths Secretary of State for the Colonies has expressed his full sympathy with the project by becoming one of the Patrons of the Show. We can only recommend all interested in West Indian horses to give the Show their active support by subscribing towards the fund for prizes, or in any other way in their power. The Honorary Secretary of the Show is the Rev. Thos. P. George, Newcastle, P.O., Jamaica.

Coffea stenophylla at Dominica.

Mr. J. Jones, the Curator of the Botanic Station, reports:— 'The plot of the new African coffee (*Coffea stenophylla*) at the Station is now in fine condition and is bearing an excellent crop of berries. This is a suitable species to grow at low levels in Dominica, as it is not troubled by the coffee fly.' (For a general account of stenophylla coffee see page 6.)

'The new coffee from the Congo *(Coffea robusta)*, has now reached the flowering stage. It is not likely to prove a success at low elevations in this island, the plants being already badly attacked by the coffee leaf-miner.'

Prevention of Rotting in Timber.

Woodwork exposed to the weather frequently rots from the effect of water entering the joints. It has been suggested that this rotting may be largely prevented by the simple expedient of putting a little powdered sulphate of copper (bluestone) into mortises and joints when fixing the structure in position.

Rotting of wood is largely due to the presence of fungi, and sulphate of copper is a powerful fungicide. Used in the manner suggested, any water entering a joint will diffuse the sulphate of copper through the wood and prevent its decay. So simple a remedy is worth trying.

West Indian Products in London.

The second article by Mr. J. R. Jackson, A.L.S., formerly Curator of the Museum of Economic Products at Kew, appears on page 275 of this number. It gives a concise summary of recent sales in the London market of some of the minor productions of the West Indies.

Cacao in West Africa.

The *Imperial Institute* for November 1902, in reference to the cultivation of cacao in West Africa says:—

An industry which has been spreading during the last few years in several parts of Africa, and on some of the islands round the coast, is the cultivation of cacao. The chief source at present is the Portuguese island of St. Thomas, and it appears that all the land suitable for the purpose is already occupied; at the same time several islands in the vicinity are being covered with plantations. The German colony of the Cameroons, on the Western coast of Africa, ranks next, but practically the whole production is shipped to Hamburg. The following figures show the output during recent years:

	1892.	1895.	1897.	1898.	1899.	1900.
Bags.	900.	2,640.	5,400.	6,745.	9,047.	9,833.

It is expected that Madagascar, which has not completely recovered from the war with France, will become one of the most important sources of cacao, the central portion and the eastern coast especially, from Tamatave, being highly suited to the industry. Complaints have from time to time been made that the German planters improve the outside appearance of the bean to the detriment of the 'break,' but that matter can be readily remedied.

Diseases of Poultry.

In this issue Mr. J. Barclay completes his account of the diseases commonly affecting poultry in the West Indies. The present article, together with those in the preceding numbers of the *Agricultural News* furnish poultry keepers with simple and practical means for the prevention and cure of the ordinary ailments of their birds.

Peasants' Cacao Plots in St. Lucia.

In the course of his Annual Report for 1901, Mr. A. F. Palmer, the Magistrate for Districts II and III of St. Lucia writes:—

In the Second District there was a general depression during the last three months of the year owing to an unparallelled shortness of the cacao crop. The severe gust of wind experienced in July and August did considerable damage to the old trees, causing most of the young pods to wither.

Cacao growing as a peasant industry is not advancing; the emigration to Cayenne deprives the districts of nearly all the able-bodied men, with the result that little or nothing is being done in keeping up old, or starting new, plantations.

There are new ventures by some possessing capital, and large areas are being planted in a few localities, but however well these may succeed they will not create in the future that general prosperity which would be secured by a large number of small holdings.

It should be the aim of all interested in the agricultural development of the colony to promote and encourage the establishment of small areas. Three acres of well kept cacao would give a fair income to a labourer and could easily be maintained single handed.

East Indian Bananas at Dominica.

Among the varieties of East Indian bananas received at the Botanic Station from Kew, the one known as 'Guindy' deserves special mention. Recently two very large bunches were ripened and proved to be of fine flavour. It is well worth growing as a dessert fruit.

Another imported kind called 'Pisang Maas' proves to be the same as the local variety well known under the names of 'Figue Sucrèe' and 'Lady's Finger.'

St. Vincent Crown Lands.

It is encouraging to find that notwithstanding the heavy damage sustained by the purchasers of Crown Lands in St. Vincent, many of whom lost their entire cultivation of cacao and other products, the people are still eager to extend planting operations during the present season. The Agricultural Instructor reports having received applications for over 3,000 economic plants of various kinds during his recent visit to the Adelphi and Park Hill settlements.

West India Sugar in Canada.

From the note on page 274 it will be seen that the trade in sugar between the West Indies and Canada is reported to have increased during the past season. This is the more gratifying in view of the possible changes which may be produced in the United States market. Dependence on one market only is not a good condition for any industry.

Arrowroot in Barbados.

The figures quoted on page 277 indicate that the arrowroot industry of Barbados is more important than might be supposed. Altogether about 336 acres in the northern parishes are under this crop, and the annual value, at the low price of 9*s.* per 100 lb., is as much as £5,000. The produce finds a ready local sale.

School Gardens.

The article on School Gardens appearing on page 285 is the first of a series in which we propose to give an account of what is actually being done in this direction in England. The plans of the gardens should be useful to teachers in the West Indies, remembering of course that various modifications will be necessary to adapt the methods described to local conditions.

INSECT NOTES.

The Orange Bark Weevil.

(Cryptorhynchus sp.)

An interesting insect was found attacking orange trees in Grenada in 1900, and as it is likely to be found not only in Grenada but elsewhere in the West Indies, a short account may prove interesting.

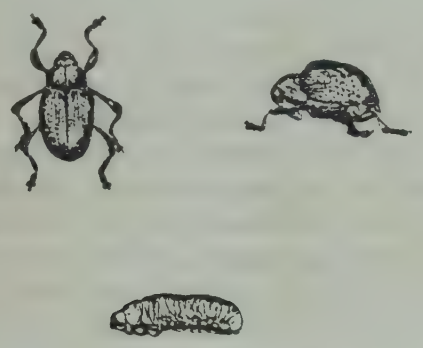


Fig. 18. The Orange Bark Weevil.

Beetle, from above and from the side, about natural size. Grub, from the side, half natural size.

The weevil in question is a small brownish insect, about half an inch in length; the head is small, prolonged into a curved beak which is usually concealed under the body. The thorax is brown with a sparse covering of small, whitish scales that give it a dingy-white appearance. The wing cases are large, fitting closely to the body, of a dingy whitish-brown. The legs are long, and the under surface of the body has large white scales which give it a beautiful appearance under a magnifying glass. This beetle lays eggs on, or in, the bark, and the little grub that hatches eats into the bark and commences to eat the wood below. In time it forms a neat cylindrical pit, extending into the wood, about $\frac{3}{4}$ inch deep, and $\frac{1}{4}$ inch in diameter. In this pit the grub lives undisturbed.

The grub is white and fleshy, with a large head armed with powerful jaws. It has no legs and remains in this pit till it is fully grown. Then the grub makes a thin, tough cocoon, and turns to the chrysalis. From this the perfect weevil emerges, eats through the thin bark over the pit and comes out.

The weevils may be found on the branches and trunk of the tree, and their colour is so much like that of the bark that it is no easy matter to find them.

Fortunately, the insect needs to be very numerous before it becomes seriously destructive, and it is not a difficult matter to destroy it if it is found to be attacking a tree. By tapping the tree with the point of a penknife, the pits are easily found, and when found, can be cut open and the grub or chrysalis killed. If this is not satisfactory, a good plan is to paint the trunk and large branches with the following mixture :—

Crude carbolic acid	one pint
Whale oil soap	2 lb.
Clay	

Mix the soap with one gallon of hot water. Stir in the carbolic acid (Phenol), add 10 gallons of water and enough clay to thicken it: two applications should be made with intervals of one to two weeks between. This mixture keeps beetles from coming to lay eggs and kills any grubs that may be in the tree. It also has a beneficial effect in destroying lichens and other growths on the bark, though it does not injure the latter. It is also wise to whitewash the trunk and branches of neighbouring trees so that they may not be attacked. This insect is one of those minor pests that are rarely troublesome except in the case of a few trees here and there, but do become destructive when orange trees are planted in any number. Its work is so characteristic that the pest is not likely to be mistaken, and the above description and figure may help in determining its identity in case of doubt.

Specimens of similar insects attacking orange and lime trees should be sent to the Head Office for determination, as the records of all such cases are of value.

GARDEN NOTES.

Grafting or Budding Tape.

The following simple method of making grafting, or budding tape is taken from the *Bulletin of Miscellaneous Information* for October 1902, issued by the Botanical Department, Trinidad:—

'Materials:—(1) White cotton tape, $\frac{1}{2}$ inch wide;
(2) Bees-wax } equal parts.
(3) Ship's pitch }

Directions:—Put equal parts ($\frac{1}{2}$ lb of each is sufficient for about 15 yards of tape) of bees-wax and ship's pitch in a small metal or earthenware vessel with a wide mouth, and heat over a fire, stirring as the two constituents melt together. Then plunge a piece of tape of convenient length into the liquid, keeping hold of one end with the finger and thumb. With the other hand hold two small pieces of wood on each side of the outer end of the tape, just in front where it is held by finger and thumb. Then pull the tape through between the two pieces of wood so as to remove extra wax and distribute it evenly over the tape. As each piece is dipped, it should be hung on a wire to dry. It will be cool and ready for use in a few minutes.'

Commenting on the above the Editor, Mr. J. H. Hart, writes: 'The black tape used by electrical engineers for covering wires is a useful substitute. As it is packed in air-tight tins, it can be kept in good condition for lengthy periods.'

Analysis of Volcanic Dust. Through an oversight the last two lines in the analysis of volcanic dust, given on page 270 of the *Agricultural News*, are meaningless.

Readers are requested to place asterisks or other marks to denote that of the potassium oxide (potash) present, ·027 was soluble in one per cent. solution of citric acid.

Similarly of the phosphoric anhydride (phosphoric acid) the proportion soluble in one per cent. citric acid was ·028 per cent.

BEE-KEEPING.

The Uses of Honey.

Before cane sugar was produced on a large scale, honey was the chief sweetening agent. It possesses certain qualities and characteristics, which no substitute can supply. For this reason its use for various purposes is recommended. On page 265 of the *Agricultural News* some general remarks were made as to the uses of honey. The following recipes have been prepared by Dr. R. Hamlyn-Harris. The original authors of the recipes are indicated in brackets at the end of each.

Honey Tea Cakes: Take 1½ lb. of flour, 1 lb. of honey, ¼ nutmeg grated, ½ tablespoonful of ground ginger, ½ teaspoonful of carbonate of soda. Mix the flour and ginger and nutmeg. Dissolve the honey and soda in a little hot water. Work the whole into a smooth dough with the butter beaten to a cream. Roll it half an inch thick, cut it into small cakes, and bake them twenty-five minutes in a moderate oven. These to be eaten in perfection should be served immediately. [Bancks].

Honey Lemon Cake: Take 4 oz. of butter, 1 lb. honey, four eggs well beaten, one teaspoonful of essence of lemon, half a teaspoonful of milk, one teaspoonful of soda, flour enough to make it very stiff. Bake at once in a quick oven. [Bancks].

Rich Honey Cakes that will keep for months: Beat 1 lb. butter to a cream, add 4 oz. castor sugar. Mix a teaspoonful of baking powder to a pound of flour and add gradually to butter and sugar beating all the time. Add ¾ lb. of run or extracted honey. Take eight eggs and divide the yolks from the whites beating each well. Add first the yolk and then the whites to the other ingredients. The more this cake is beaten the lighter and better it will be. [Bancks].

Honey Sandwiches: Cut thin bread and butter and spread with honey. Sprinkle with oatmeal, baked till just brown. Press another slice of thin bread and butter on the top and cut into fingers. [Bancks].

Cough Mixtures: (1) Honey, sweet oil, lemon juice and sweet spirits of nitre, in equal parts.—Dose ½ teaspoonful. (2) Barley water mixed with honey and juice of lemons. Drink warm.

For Coughs and Sore Throats: Honey either alone or mixed with lemon or lime juice.

For Inflamed Eyes: One part of honey to five parts of water. Mix and bathe the eyes two or three times a day till well.

For Influenza: To 4 oz. of honey add the juice of a lemon or lime. Take a teaspoonful or two occasionally, as hot as possible. This simple remedy has been found very useful.

Honey pop corn Balls: Take one pint of extracted honey, put it into an iron frying pan and boil until very thick, then stir in freshly popped corn, and when cool, mould into balls. This will especially delight the children. [Miller].

Honey-caramels: One cup of extracted honey of best flavour, one cup granulated sugar, three tablespoonfuls sweet cream or milk. Boil to soft crack or until it hardens when dropped into cold water, but not too brittle;—pour into a greased dish stirring in a teaspoonful of extract of vanilla just before taking off. Let it be ½ to ¾ inch deep in the dish, and as it cools, cut in squares and wrap each square in parafin paper, such as grocers wrap butter in. To make chocolate-caramels, add to the foregoing one tablespoonful melted chocolate just before taking off the stove, stirring it in well. For chocolate-caramels it is not so important that the honey be of the best quality. [C. C. Miller].

SCREW-PINES.

These plants are characteristic of the Old World Tropics, a large number of them being only found in the islands of the Indian Archipelago. They usually occur on the sea-coast or in marshes, sometimes covering large tracts of country with a mass of vegetation which is almost impenetrable.

The leaves are narrow and tough and leathery, and are armed along the midrib and edges with sharp recurved prickles. They are arranged in dense tufts or crowns at the ends of branches, and it is this resemblance to pine-apple leaves that gives the plants their name of screw-pines.

Fig. 19. Screw-Pine. *(Pandanus utilis).* Showing the general habit of the plant.

The leaves of some screw pines found in Mauritius are used for making bags or sacks, in which sugar is exported. Baskets, fans, and mats are also made from the leaves in various parts of the world, and the rough fibrous fruits are employed as scrubbing brushes.

A very remarkable feature about these plants is their aerial roots. They grow out from the stem protected by a well-marked root cap, and down into the soil. They are sometimes called 'flying buttress' roots, their function being to give an additional support to the tall, branched stem with its mass of foliage.

POULTRY.

The following concludes Mr. Barclay's interesting notes on the prevention and treatment of some of the diseases of common occurrence among poultry. His next contribution will deal with 'Setting Hens' and 'Chicken Rearing':—

YAWS.

When little pustules or swellings break out about the heads of chickens, the trouble is sometimes called chicken pox, but in the West Indies it is called yaws. It seldom attacks hens here,—only chickens.

The diseased growths, if left untended, grow round the eyes and beak until these are closed, and often grow into the inside of the beak.

TREATMENT.

The first thing to do is to remove the cause. This is uncleanliness in some form, generally through the chickens sleeping in a close coop among the accumulations of their own excretions. Keep the chicken coop open and airy.

Wire netting or simply wooden bars across the front of a chicken coop is enough protection, and ventilation is secured. Clean out the coop every day and fling in some fine earth and sand: lime is a little too caustic if used alone and may injure the chickens: wood ash is good. Give the chicks a dose of Epsom salts. These may be dissolved in water and given, but the surest way is to mix with soft food. One teaspoonful of the salts will do for a dozen, week or two-week old chickens; two teaspoonfuls will do for a dozen three-week to four-week old chickens, and a good dessertspoonful to a dozen chickens just over four weeks, and a little more as they grow older. Twice a week the salts should be administered to assist a cure: as a preventive, once a week is enough. Such burning stuffs as carbolic acid are often recommended and undoubtedly are effective, but when the pustules or swellings are near the eyes, or at the edge of, or inside, the beak, there is a danger of the chickens getting carbolic acid in their eyes or mouth. Iodine is much milder and is effective, though slow. Take a quill or camel-hair brush, dip lightly in iodine and paint the sores. I prefer to take an old penknife, make it sharp, then make it red-hot, and cauterize each swelling. This can be done safely no matter where the swellings or pustules are. They do not grow again when thus treated, although, of course, they may break out in other places so long as the blood of the chicken is not cleared of the poison inhaled in its filthy or ill-ventilated coop.

GAPES.

When you see a fowl going about listlessly, and every now and then gaping as if it had a difficulty in breathing, and then seems to be swallowing something, suspect gapes. Gapes is the result of a collection of little thread-like red worms in the windpipe, and the trouble is caused by fowls drinking filthy water such as you see them doing around kitchens where sloppy water is thrown about. It is also caused by feeding on the same piece of ground for a long time, so that the soil is stale and sour with remains of old food and the droppings of the fowls. Again, cleanliness will prevent this disease.

TREATMENT.

To cure it, take a stiff wing feather from a fowl, trim it, only leaving half an inch of feather at the tip: dip this in kerosene or turpentine, put the fowl under your left arm, shove up its gullet with the fore finger and thumb until you see the opening into the windpipe plainly, then put the feather gently down, turn it quickly round three times and withdraw. Let the chick have a breath, take a fresh feather,—dry this time,—and repeat the operation. You will probably see specks on the feather like blood, and it may be; but these will likely be the minute gape worms. Repeat the operation a third time with a feather dipped in sweet oil. If the worms do not come up on the feathers, they are at any rate dislodged and killed, and the fowl will cough them up and expel them.

DIARRHŒA.

In diarrhœa, which is easily noticed, a mild dose of half salad oil (cocoa-nut, cotton seed, olive, sun flower, or pea-nut) and castor oil is best, followed by feeding on dry rice for a week.

LICE.

When fowls seem to mope without any apparent cause, suspect lice. Give them a dusting with insect powder, let them have some dry earth and wood-ash for a dust bath, and apply kerosene oil to the ends of their roosts.

CRAMP.

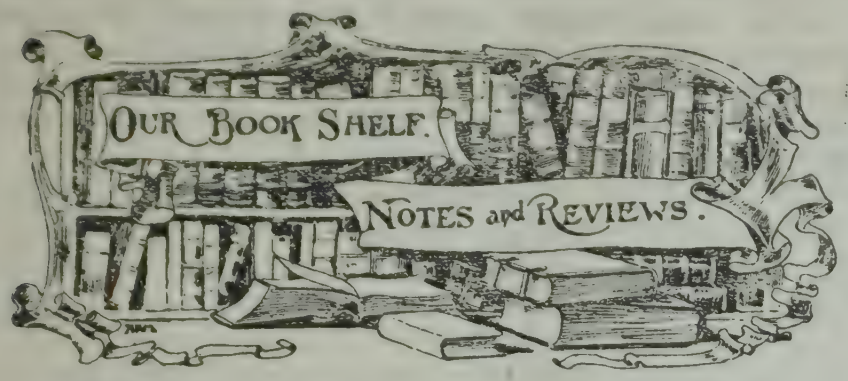
Sometimes the legs of a fowl stiffen so that it is unable to walk and simply sits, yet it has a hearty appetite. This will probably be cramp in the legs and is caused by damp. To cure, steep legs in warm water, or rub with hot water cloths, then rub with a good embrocation, or turpentine; wrap up legs in cloth, and put the bird in a cosy box during the night. Repeat every night until better.

OTHER DISEASES.

Fowls are subject to many other diseases like bumble foot, apoplexy, comb-disease, constipation, consumption, dysentery, rheumatism, crop-bound, debility, egg-bound, inflammation of ovary, eyes and liver; gapes, gout, indigestion, liver diseases and worms, but those fully described are most common in the West Indies.

SUMMARY.

In conclusion I will summarize what I have said. Keep only good layers of active disposition; give them as free a run as possible; have an airy, comfortable house built of materials at hand, sheltered from the wind and rain, have dry, comfortable nests free from lice, and made private; feed scraps in the morning, and corn varied with household scraps, cocoa-nut, brown rice, and cheap peas like Congo peas in the evening; purchase as little food as you can help, grow it all if possible; keep everything clean; give a dose of Epsom salts all round once a week as a preventive of diseases; take care of the manure; keep chickens by themselves; do not in-breed; breed only from pure-bred cocks, and then eggs will be plentiful with you who are careful and follow out these ideas, and the many who do not know how to get good results, the many who have not the opportunity of keeping fowls cheaply, if at all, as in towns, and the many who have not the aptitude, and the many who will not trouble to exercise care and thoughtfulness will have to buy them from you.



PHYSICAL GEOGRAPHY. By Margery A. Reid, B.Sc. *Allman & Son, Ltd. London. Price 2s. 6d.*

The authoress states that she has tried in this book to treat the subject of Physical Geography as based on observation, rather than experiment. The book should prove useful to teachers and others who are dealing with the elementary parts of the subject.

The form and rotation of the earth is discussed and the chief facts from which we derive our knowledge of the shape and movements of the earth given, and their bearing explained. The apparent movements of the sun and the movements and changes of the moon are treated in the same way. Then follows an account of the atmosphere, its composition, temperature, pressure, moisture and movements. Four chapters are devoted to the sea, treating of its depth, deposits and movements.

We then have a short account of the formation and breaking down of rocks; the chief agents in the elevation and wearing down of rocks are enumerated and their action explained and illustrated.

The later chapters contain short accounts of the distribution of plants, animals and population, and we find the chief factors bearing on distribution stated and explained and their mode of action worked out.

Finally, we have a short chapter on the geographical and other changes which have occurred during geological time.

THE UNIVERSE. By F. A. Pouchet. Revised and edited by Professor J. R. Ainsworth Davis. *Blackie & Son, 1902. London. Price 7s. 6d.*

Pouchet's *Universe* has been so long known to naturalists that it seems almost superfluous to give any account of its contents. The subject-matter is very wide, covering the animal kingdom, vegetable kingdom, geology, the air, the sidereal universe and an account of monsters and superstitions.

The present edition, which is attractively bound, printed and illustrated, has been revised and brought up to date by Professor Ainsworth Davis. The text, however, has been interfered with as little as possible, so that the book has lost none of the charms of its style.

It would be hard to find a book which would better arouse in children an interest in, and a love for, the study of nature.

Lectures to Teachers at Barbados.

The second lecture to the elementary school teachers of Barbados at the Bridgetown centre on the manner and method of teaching agriculture by means of object lessons, was delivered at Harrison College on December 6, by Dr. Longfield Smith. Thirty-six teachers attended. The differences between the various kinds of natural waters, the solvent power of water, the formation of clouds, dew, rain and rivers, the boiling point, boiling under reduced pressure and its application to the manufacture of sugar, the expansion and contraction of water by heat and cold, the point of greatest density of water, were all explained, and illustrated by simple experiments. The chemical composition of water and the preparation and properties of hydrogen and oxygen were demonstrated.

At the close of the lecture, cyclostyle notes were distributed to each teacher. A similar lecture was delivered at the St. Peter's centre on December 13. The lecture was attended by eighteen teachers and by several ladies and gentlemen of the parish interested in the subject.

VALUE OF A HERBARIUM.

In a recent issue we quoted from *Botanizing*, Prof. W. W. Bailey's practical book for field botanists, an extract on the usefulness of Botanic Gardens. The following appreciation of a Herbarium, from the pen of the same author, forms an interesting supplement:—

But let us consider a little more closely the uses of a herbarium and of a botanic garden.

In regard to the former it is to be said that much of the systematist's work is of necessity upon dried plants. These he soaks in warm water, which in a measure restores the contours and softens the tissues so that they can be examined. A botanist could not by any chance visit all countries nor even every part of his own, but in the herbarium he can have all or a large part of the plants of any given region exposed in their natural sequence, or what science at the time considers such. Plants even of one family or genus are not all simultaneously in flower or fruit, but in the herbarium all parts can be thus viewed. The natural affinities and geographical and altitudinal distribution can be learned in no other way, though closet work must need supplement more direct field observation.

Again, the herbarium is a cyclopædia of ultimate appeal. To it the student in doubt may appeal as to an authority. At least he will ascertain what the best investigators have thought. Hence a fine public herbarium is something to be amassed and cherished.

A botanic garden is almost equally important. Therein plants should be arranged as nearly as possible by their natural affinities, well and clearly labelled, so that all may learn them. Many horticultural experiments can here be tried. Moreover, the garden should, like that of Kew, be a centre of dissemination both of knowledge and useful products. It should at all times be open to the public and hence become a park of most delightful and varied usefulness.

DEPARTMENT NEWS.

Dr. D. Morris, C.M.G., the Commissioner of Agriculture for the West Indies, touched at Barbados on the 16th. instant on board the *s.s. Dahome* en route to St. Vincent, Grenada and Trinidad. During the last month Dr. Morris has been engaged in visiting the Stations and Schools of the Department at St. Kitt's, Antigua, Montserrat, Dominica and St. Lucia. He has also delivered addresses to the Agricultural Societies at Antigua, Montserrat and Dominica and, on December 12, attended an important meeting of the St. Lucia Agricultural Society.

It is probable that Dr. Morris will return to Barbados about the end of the present month.

GLEANINGS.

There was a fair honey flow from logwood and other trees at St. Lucia during the latter part of November and strong colonies are rapidly filling supers.

The Hon'ble Francis Watts states that some of the manurial experiments carried on with sugar-canes at Antigua 'emphasise the point that it is not remunerative to use artificial manures upon land in poor physical condition.'

The *Mirror* states that the shipments of cacao from Trinidad to the end of November were 29,435,000, or about 60,000 bags more than last year.

The value of the cacao drier at the Dominica Botanic Station was appreciated and taken practical advantage of during a recent spell of rainy weather.

The seeds of annatto, also known as *roucou*, are stated to be an antidote for cassava poisoning. Any information on this point would be of practical value and interest.

Devil grass, or Bahama grass now found almost all over the tropical and temperate regions of the world, is a native of the East Indies. It is universally appreciated for its power to withstand drought, and to thrive on poor soils, and is often employed for tennis lawns.

The sale of plants at the Tobago Botanic Station during October realized £4 4*s*. 9*d*. Cacao plants were most in demand.

Varieties of cotton received from Montserrat are germinating freely at the Botanic Station, Tobago. Cotton occurs in a wild state in Tobago and good results may be hoped for from the improved varieties now introduced.

The Ligu cacao *(Theobroma bicolor)* is now fruiting at the Botanic Station, Dominica. Several plants of the Alligator cacao (*Theobroma pentagona)* has also flowered. Both of these species were obtained from Nicaragua by Mr. J. H. Hart, Superintendent of the Botanic Gardens, Trinidad.

Some first-class poultry comprising Buff Orpingtons, Wyandottes and Plymouth Rocks have recently been imported into St. Lucia by private individuals.

A quantity of Seville orange and rough lemon seeds has been sown at the Tobago Botanic Station as stock for budding.

The sponge industry of the Turks and Caicos Islands showed a substantial increase last year over the year previous. The value of sponge exported in 1900 was £3,950, while that exported last year was £9,277. This industry is not carried on wholly by the people of these islands. More than three-fourths in value of sponge exported last year was shipped to the Bahamas and may be said to represent the gatherings taken from the Caicos banks by schooners from the Bahama Islands.

On one estate in Grenada where very particular attention is given to cultivation and manuring, the efforts of the proprietor have been rewarded by a yield of 130 bags (of 182 lb. each) of cacao from about 16 acres. This is at the rate of 8 bags per acre.

According to the *Maritime Merchant* the market for molasses in Halifax is very firm and sellers are demanding full prices. The demand is remarkably good at present and holders anticipate that the stocks will be no more than ample for the season's requirements.

At Grenada demonstration lessons in budding and pruning were given by the Agricultural Instructor at the Botanic Station to the boys of the Anglican and Roman Catholic Schools on the first and second Fridays in September last.

Reference has already been made in the pages of this Journal to the valuable work done by Agricultural Instructors in these islands. Of this the following extract from a recent report by Mr. Geo. S. Hudson, the Agricultural Instructor at St. Lucia supplies an instance :—'On October 4, I inspected Palmiste Estate, Soufrière, the property of Messrs. Minvielle and Chastanet and was pleased to find that in continuation of my instructions they have transferred their plantation from unhealthy weak plants to vigorous trees. On the 5th October I went over Mr. Lafitte's Cacao property "La Dauphin." Here also my instructions have been carried out with excellent results, some yields being as high as 8 cwt. per acre without manure.'

The branch Agricultural Societies at Soufrière and Choiseul in the island of St. Lucia are said to be doing useful work. Their efforts include the importation of pure bred stock and the formation of village libraries of agricultural literature.

The Jamaica *Gleaner* of November 26, reports that 'the St. Ann Parochial Board has directed its clerk to apply to the Superintendent of Public Gardens for a hundred eucalyptus trees, free of charge, to drain the swamps round St. Ann Bay. If the request is granted, as we presume it will be, a portion of the trees will be distributed to the residents of the lower part of the town and the rest planted on lands belonging to the Board. The experiment is an interesting one for Jamaica, but the utility of the eucalyptus tree in drying up swamps and improving the condition of a town has been amply demonstrated over and over again in Australia and elsewhere. We hope other Boards will follow the up-to-date example set by St. Ann, and that they will take up the campaign against the malarial mosquito on the lines recommended by Major Ross and other authorities.'

EDUCATIONAL.

School Gardens.

School Gardens are now becoming established in many islands throughout the West Indies and will doubtless, year by year, accomplish increasingly useful work in teaching the elementary principles of agriculture. Teachers in these colonies will doubtless be glad to learn something of what is being done in other parts of the world. The methods employed with success in England should not, of course, be adopted entirely, as in many details they will be found unsuited to the conditions of the tropics.

The following is the plan of the garden, and scheme of instruction at a village school with average attendence of 118, and with a staff consisting of Head Certificated Teacher, two Female Assistants and one Assistant.

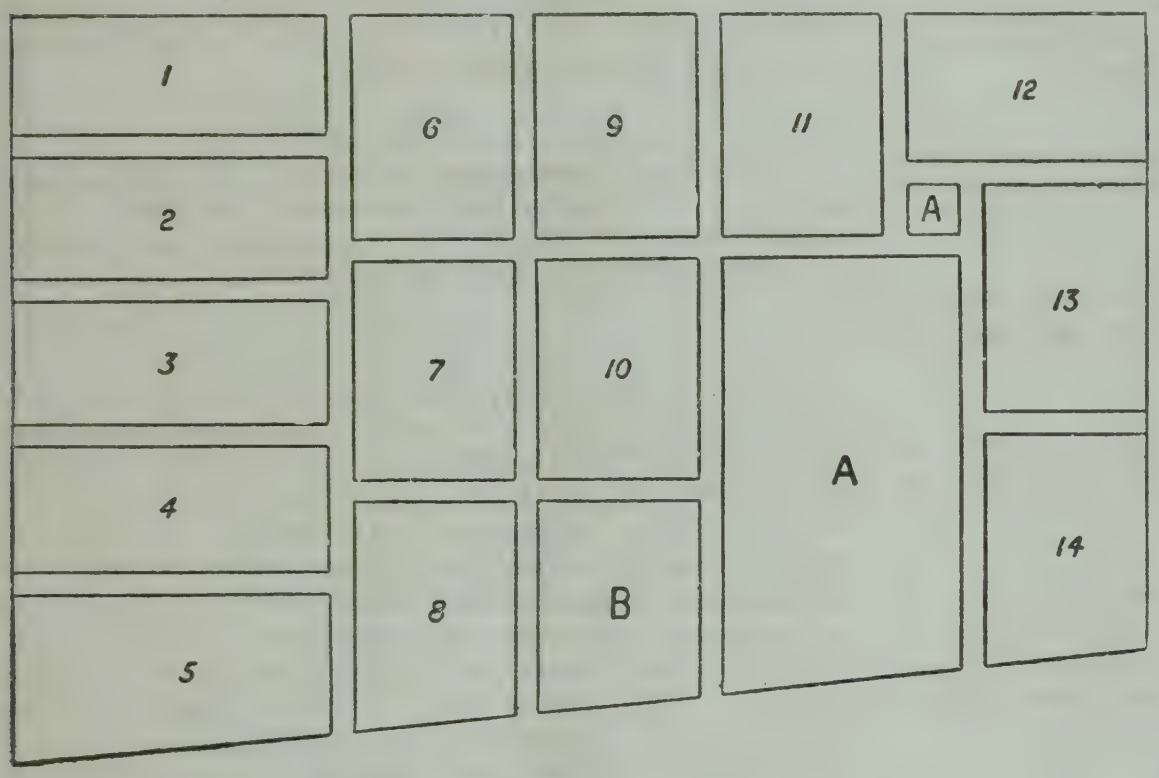


Fig. 20. General Plan of Garden.

Operations were begun with 7 forks, 7 spades, 7 draw hoes, 2 dutch hoes, 6 rakes, and 2 garden lines; the cost of these was £3 6*s*. 6*d*. The stock of tools has since been augmented by the purchase of more forks, etc., a wheelbarrow, water pot, boat baskets and garden towels. All seeds, with the exception of potato seed are found by the managers and cost about 15*s* each year. Manures (farm yard and and chemical) cost 15*s* annually and the rent of the ground is £1. These expenses are met by the Government Grant of £2 16*s* 0*d* and an Aid Grant of £2. On the fruit plots the following trees were grown:—Two pear trees, two apple trees, two plum trees and one cherry tree. Some bush fruits are also grown. The boys are taught pruning, grafting, and budding, in addition to general fruit culture. The instruction is given once a week from 2.35 to 4.10 p.m. The boys stand round one of the plots, while the teacher demonstrates how each operation is to be carried out. Afterwards they disperse to their own plots and each does the necessary work to the best of his ability. On wet afternoons the boys have to talk about, and write compositions upon, the work which has been done or is to be done in the gardens. The instruction is continued throughout the year.

This account is taken from a pamphlet recently issued by the English Education Department. For further particulars see the *West Indian Bulletin*, Vol. III., pages 211-230.

Lectures to Teachers at Montserrat.

A third course of six lectures in Agriculture was delivered to the teachers of Elementary Schools at Montserrat in November last by Mr. G. Whitfield Smith, the Travelling Superintendent of the Department. The Lectures lasted for three hours each day and were attended by twelve teachers. Experiments, of a simple nature, requiring only apparatus to be found in any household, were performed to illustrate the subjects dealt with. In cases where details of plant structure were explained the teachers were provided with fresh specimens of seeds, stems, roots, leaves and flowers which they were required to dissect for themselves. To aid them in doing so, large coloured drawings of the plants discussed carefully prepared beforehand were distributed.

The subjects dealt with on this occasion were as follows:—

Lecture 1. Germination—The seed dissected and described—What a seed contains—Conditions necessary for successful germination—Points of difference between Monocotyledonous and Dicotyledonous seeds. Uses of the cotyledons—Albuminous and Exalbuminous seeds—What becomes of the radicle—plumule—(illustrated by germinating specimens of corn and bean seeds.)

Lecture 2. Structure and functions of roots, stems, leaves and flowers (illustrated by living specimens and coloured diagrams.)

Lecture 3. The soil and atmosphere. Their relation to plant life.

Lecture 4. Elements of plant food in a soil—Physical condition of the soil necessary for successful growth of good crops.

Lecture 5. Soil moisture.—Its source.—Movements. Importance.—How conserved.—Soil and other mulches. Manures and their value.

Lecture 6. How the plant lives—What becomes of the food taken in by plants from the soil and atmosphere. (Illustrated by simple experiments showing—transpiration of moisture from leaves—Formation of starch in leaves dependent on light—Evolution of oxygen from green leaves in sunlight—Respiration of plants.) In addition to the above, four demonstration lessons in pruning, budding and preparing soil for seed beds were given by Mr. A. J. Jordan, the Agricultural Instructor.

In place of the usual examination at the close of the course, those teachers who had attained first rank in previous examinations were on this occasion made each day to explain to the others what had been described to them in the lecture of the day before.

Great interest was displayed throughout the course and the teachers are said to have acquitted themselves in a very creditable manner.

COMMERCIAL.

With the view of assisting in finding a market for the disposal of local produce, arrangements have been made with the following Agents in these Colonies who will be prepared to receive consignments and obtain the best prices for them.

It is particularly urged that no shipments be made until an assurance has been received from the Agents themselves that they are prepared to accept such shipments.

Agents in the West Indies.

BRITISH GUIANA—B. S. Bayley, Water Street, Georgetown.
TRINIDAD—J. Russell Murray, Port-of-Spain.
BARBADOS—T. S. Garraway & Co., Bridgetown.
ST. LUCIA—Captain H. Henville, Contractor & Agent, Castries.

MARKET REPORTS.

London,—November 25, 1902.—Messrs. J. HALES CAIRD & Co., Messrs. GILLESPIE BROS. & Co. and 'THE PUBLIC LEDGER,' November 22, 1902.

ALOES—Curaçoa, 14/6 to 40/-; Barbados 13/- to 35/- per cwt.
ARROWROOT—St. Vincent, 3*d.* to 5¾*d.* per lb.
BALATA—Demerara sheet, 2/- to 2/6 per lb.
BEES-WAX—Jamaica, fair to good pale £7 5*s.* to £7 15*s.* per cwt. In good demand.
CACAO—T'dad, 58/- to 85/- per cwt.; Dominica 56/6 to 57/- per cwt.; Grenada, common to fine 56/- to 62/- per cwt.; Jamaica, 54/- to 63/6 per cwt.
CARDAMOMS—Mysore, 1/4 to 4/- per lb.
COFFEE—Jamaica, 37/- to 125/- per cwt. Costa Rica, 42/- to 90/- per cwt.; Peaberry 75/- to 115/- per cwt.
COTTON—West Indian 4¾ to 5 5/16*d.* per lb.
FUSTIC—£3 10*s.* to £4 5*s.* per ton. Steady.
GINGER—Jamaica, common to fine 35/- to 50/- per cwt.
HONEY—Jamaica 18/- to 23/6 per cwt.
KOLA NUTS—1*d.* to 4*d.* per lb.
LIME JUICE—Raw, 10*d.* to 1/- per gallon; Concentrated, £11 10*s.* per pipe.
LOGWOOD—Jamaica, £4 2*s.* 6*d.* to £4 7*s.* 6*d.* per ton.
MACE—1/3 to 2/10 per lb.
NITRATE OF SODA—Agricultural £9 5*s.* per ton.
NUTMEGS—90's to 60's @ 1/1 to 2/7, 132's to 95's @ 7*d.* to 1*s.* per lb.
PIMENTO—2¼*d.* to 2¾*d.* per lb.
RUM—Demerara 9*d.* to 10½*d.*, Jamaica 1/8 to 7/- per proof gallon.
SUGAR—Barbados Muscovado, 12/- to 13/- per cwt.
Jamaica Muscovado 10/3 to 13/6 per cwt.
Trinidad and Demerara 13/6 to 15/- per cwt. duty paid.
SULPHATE OF AMMONIA—£11 10*s.* to £11 11*s.* 3*d.* per ton.
TAMARINDS—Barbados 12/- to 15/6 per cwt.
FRUIT—COVENT GARDEN MARKET ('GARDENER'S CHRONICLE,' November 22, 1902.)
BANANAS—8/- to 14/- per bunch.
ORANGES—9/- to 14/- per case.
PINES—3/- to 4/- each.

Halifax, N.S.—The 'Maritime Merchant,' November 20, 1902.

MOLASSES—Barbados 24c. to 35c. Porto Rico 31c. to 34c.
ORANGES—Jamaica, $2.75 to $3.00 per box and $5.00 per barrel.
SUGARS—Bright yellow, $3.70; No. 1 yellow, $3.40.

New York,—November 28, 1902.—Messrs. GILLESPIE BROS. & Co.

BANANAS—Jamaica firsts, 90c. to $1.00; six to eight hands, 45c. to 70c.
CACAO—African, 12¾c. to 13¼c.; Caracas, 13¾c. to 18c.; Jamaica, 11½ to 11¾c., ; Grenada, 13¼c. to 13½c.; Trinidad 13c. to 14c. per lb.
COCOA-NUTS—Trinidads $16.00 to $18.00; Jamaicas $21.00 to $23.00 per M.
COFFEE—Rio, good ordinary 5⅛c. to 5¼c.; Jamaica, fair to good ordinary 5¾c. to 6c. per lb.; Manchester grades 8½c. to 10½c. per lb.
GRAPE FRUIT—$4.00 to $7.00 per barrel.
ORANGES—Jamaica, $4.25 to $4.75 per barrel.
PIMENTO—4⅝c. ex wharf, and 4¾c. per lb. ex store.
RUBBER—Nicaragua scrap 55c. to 56c. per lb; Guayaquil strip 53c. to 54c. per lb; Esmeralda sausage 57c. to 58c. per lb.
SUGAR—Muscovado, 89°, 3 5/16c. to 3⅜c. per lb.; Centrifugals, 96°, 3 13/16c.; molasses, 89°, 3 1/16c. to 3⅛c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—December 2, 1902.—Messrs. G. W. BENNETT BRYSON & Co., Ltd.
MOLASSES—Market closed.
SUGAR—Market closed.

Barbados,—December 6, 1902.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.
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CACAO—$12.00 per 100 lb.
COFFEE—Jamaica and ordinary Rio $8.50 to $9.50 per 100 lb. respectively.
HAY—New Brunswick 80c. to $1.00 per 100 lb.
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MOLASSES—No quotations.
ONIONS—Madeira $3.00 to $4.50 per 100 lb.
POTATOS—$2.21 to $3.25 per 160 lb.
RICE—Ballam $4.35 to $4.70 per bag (190 lb.); Patna $3.50 per (100 lb.); Seeta $3.50 per (100 lb.); Rangoon $2.00 to $300 per (100 lb.)
SUGAR—$2.40 per 100 lb.

British Guiana,—December 3, 1902.—Messrs. WEITING & RICHTER.
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BALATA—40c. to 42c. per lb.
CACAO—native 11c. to 13c. per lb.
CASSAVA STARCH—$7.00 per barrel.
COCOA-NUTS—$8.00 to $10.00 per M.
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—Creole, 11c. to 12c. per lb.
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BALATA—Venezuelan 42c. to 43c. per lb.
COFFEE—Venezuelan. No quotation.
ONIONS—$2.25 to $3.75 per 100 lb.
POTATOS ENGLISH—$1.60 to $1.75 per 100 lb.
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